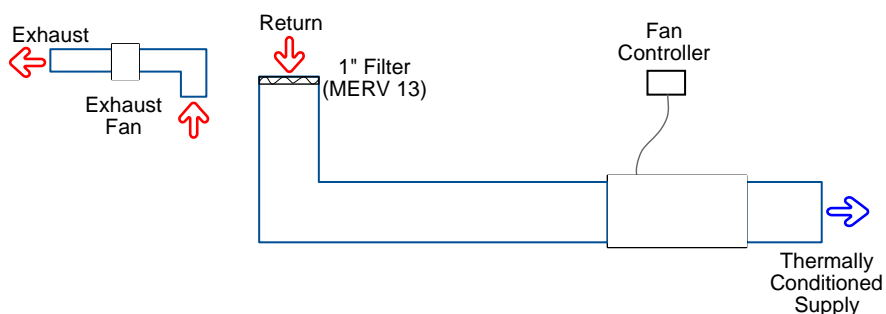


Appendix SU-1-E. Results for System E, June 6-12, 2014.**Table SU-1-E-1.** Description of **System E** component characteristics during the period of **June 6-12, 2014**.

System Parameter	Description or Measured Value
Heating	75,000 BTU/h, 80% eff., gas furnace, 1-stage burner
Cooling	3 ton, SEER13 air conditioner
Thermal distribution	Central fan with PSC motor: 1142 cfm for cooling, 1032 cfm for heating
Ventilation	Exhaust fan in main bathroom with ECM; Set to 38 cfm continuous
Filtration	MERV13, 1" (AirGaurd DPgreen13) filter installed at return air ceiling grill of forced air furnace. Some particle removal as air infiltrates through building envelope to replace air exiting home through continuous exhaust fan in bathroom.
Recirculation blower schedule	As required for thermal conditioning, with fan cyclers providing a minimum of 20 minutes per hour.
VOC removal system	None

Notes about this monitoring period

We lost a CPC 3781 midway through the operational period. The CPC 3781 indoor / outdoor data stream was constructed using both instruments until the problem occurred and the remaining instrument afterward. We lost communication for a single CPC 3787 for ~38 h. The CPC 3787 indoor / outdoor data stream was constructed using both instruments when the data was available, and a single instrument when not. All other instruments were fine.

The 24 h running statistics in the figures starts at 6/6/2014 20:30.

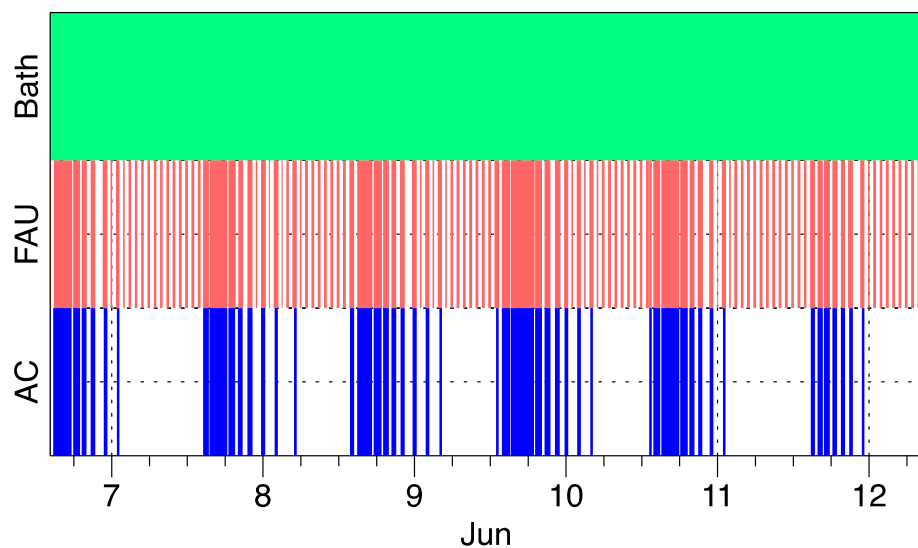


Figure SU-1-E-1. Operation of mechanical systems: Bath exhaust fan; fan on central forced air unit (FAU); central air-conditioning (AC).

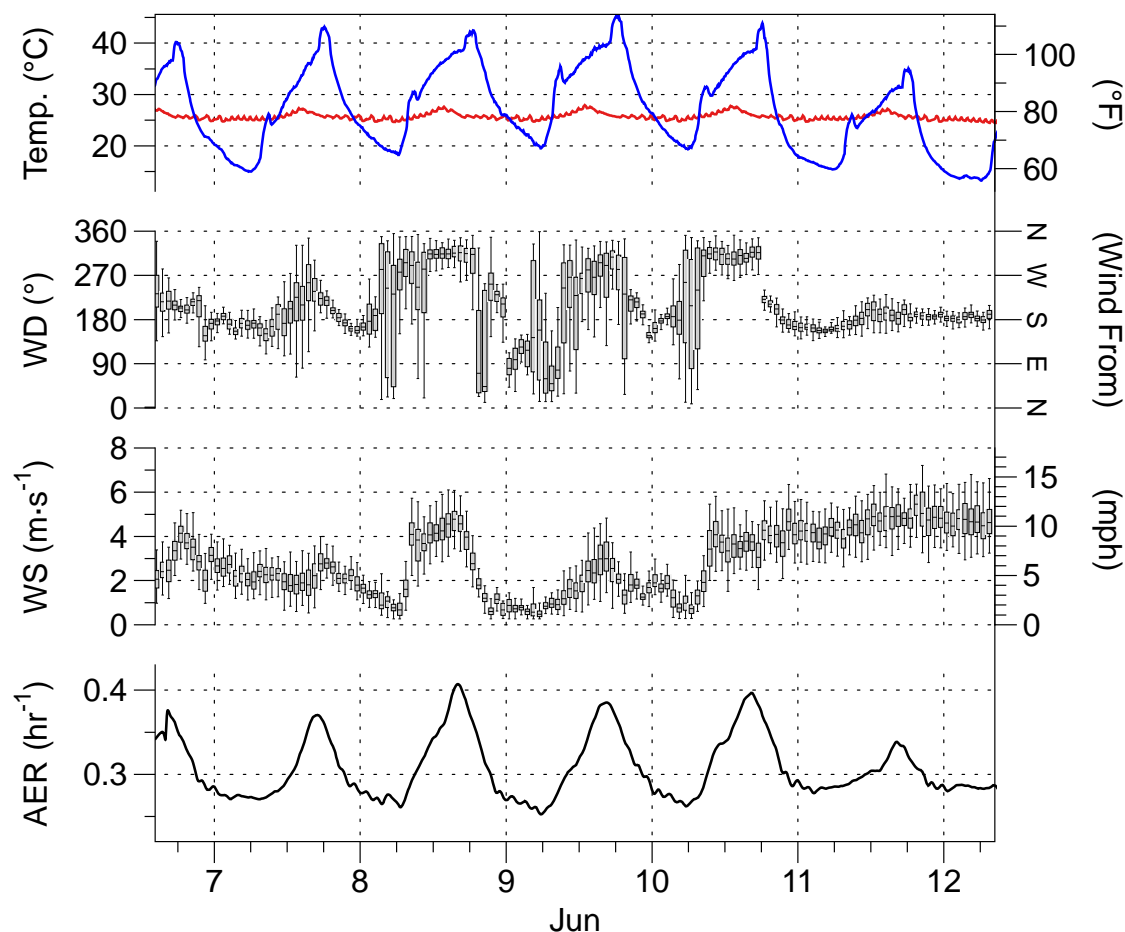


Figure SU-1-E-2. Environmental parameters measured during operation of System E, June 6-12, 2014. From top to bottom: indoor (red) and outdoor (blue) temperatures, wind direction (WD) in units of degrees from North, wind speed (WS), and air exchange rate (AER). For WD and WS, the box for each hour shows the 25th, 50th and 75th percentiles of the measured values and whiskers extend 1.5X the interquartile range (75th–25th percentile values) above the 75th and below the 25th percentile values.

Guide to plots of pollutant concentration time series and indoor / outdoor (I/O) ratios

The bottom section of each plot shows outdoor and indoor time series using the resolution of data collection: 3-min for black carbon and 1-min for all other parameters. The top and bottom of grey band are LOESS-smoothed, 1-min (or 3-min for black carbon) time-series. Also shown are time series with 1h and 24h time averaging for most pollutants and 1h and 8h average for ozone. Triangles in bottom of plot indicate the highest 1h outdoor and corresponding highest 1h indoor average during each day. The top section of each plot shows the ratio of indoor to outdoor running 24h mean values (8h for ozone) and the ratios of highest 1h indoor to corresponding highest 1h outdoor concentration each day.

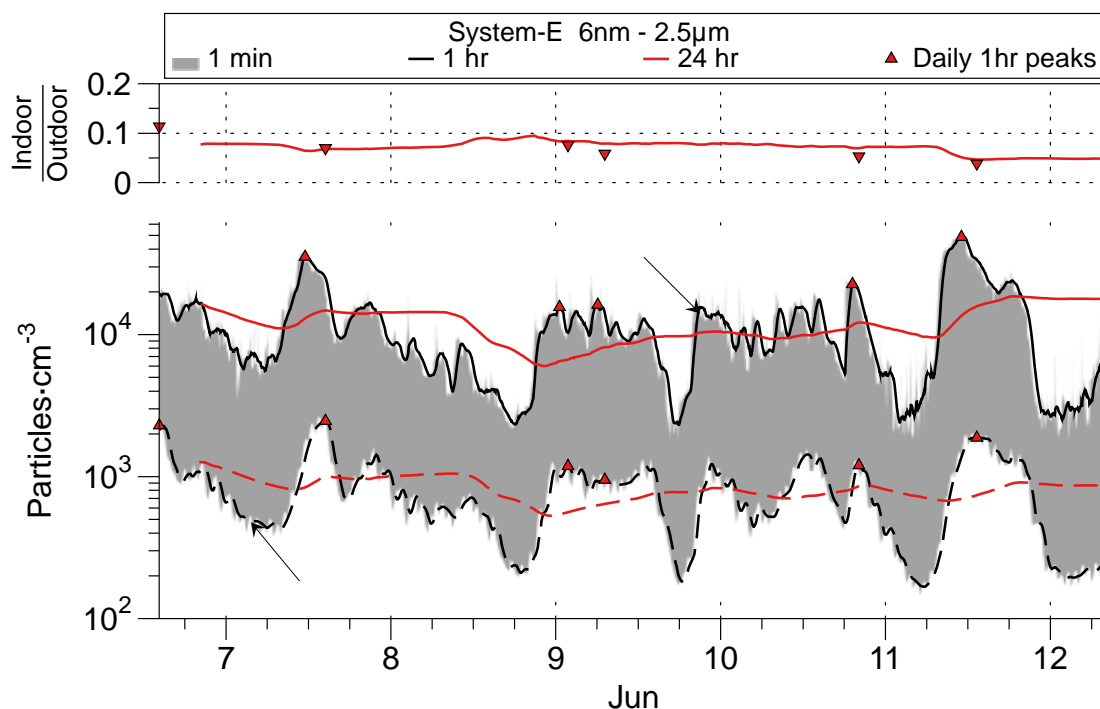


Figure SU-1-E-3. Number concentrations of 6 nm to 2.5 μm diameter particles measured outdoors and indoors during operation of System E, June 6-12, 2014. Data collected using TSI 3787 CPCs.

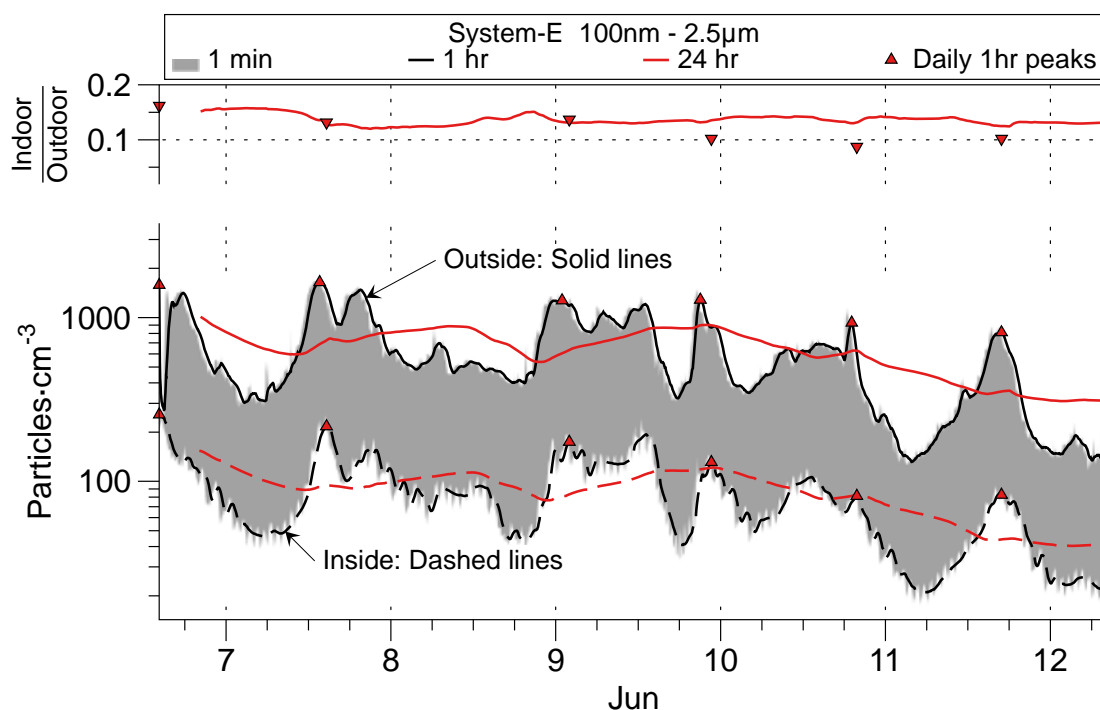


Figure SU-1-E-4. Number concentrations of 100 nm to 2.5 μm diameter particles measured outdoors and indoors during operation of System E, June 6-12, 2014. Data collected using TSI 3781 CPCs outfitted with screens to exclude particles smaller than 100 nm. Refer to “Guide” before Figure SU-1-E-3.

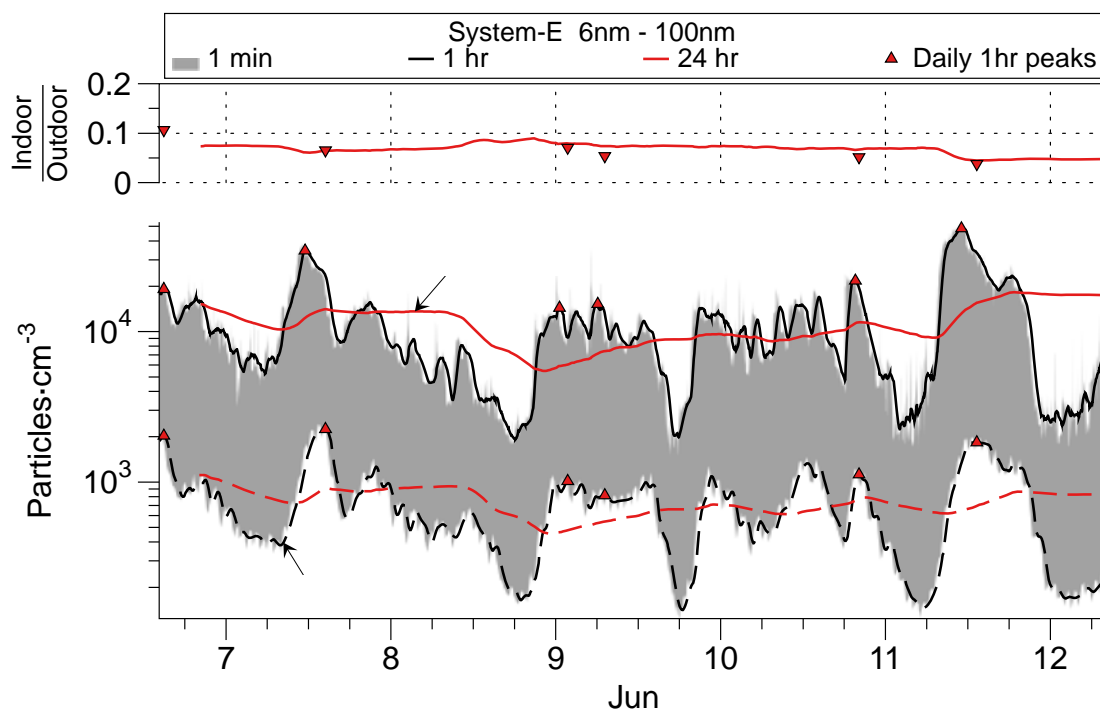


Figure SU-1-E-5. Number concentrations of 6–100 nm diameter particles measured outdoors and indoors during operation of System E, June 6-12, 2014. Data obtained as the difference between time series show in prior two figures. Refer to “Guide” before Figure SU-1-E-3.

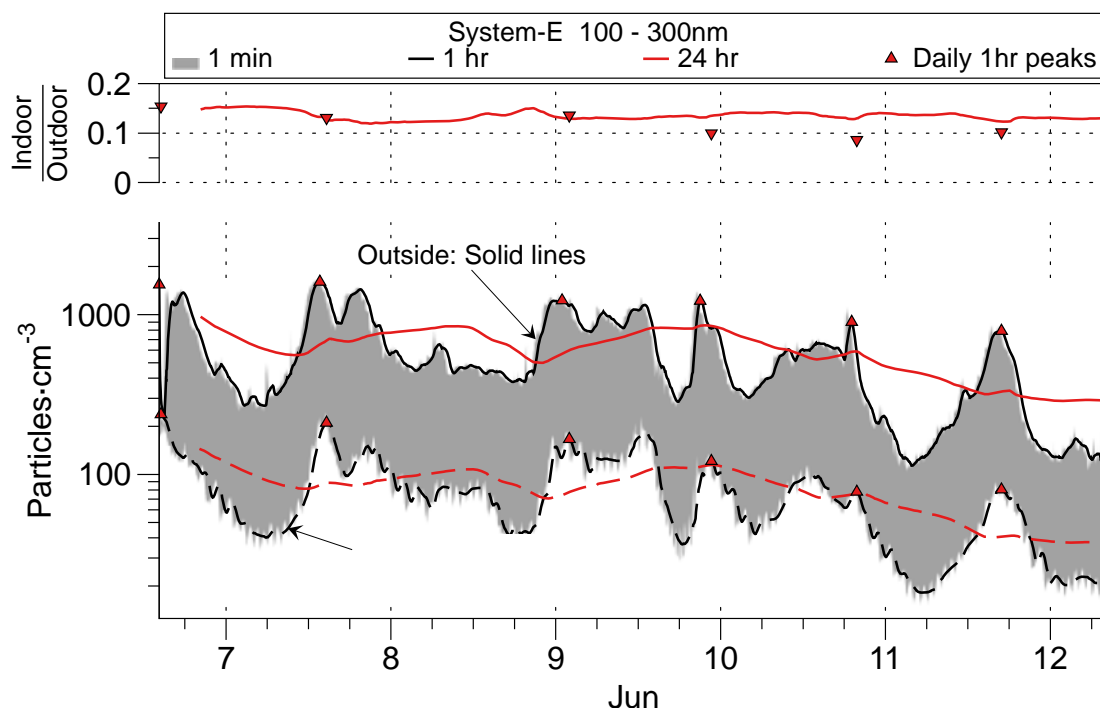


Figure SU-1-E-6. Number concentrations of 100–300 nm diameter particles measured outdoors and indoors during operation of System E, June 6-12, 2014. Data obtained as the difference between the TSI 3781 CPC with size selector and the MetOne BT637S OPC. Refer to “Guide” before Figure SU-1-E-3.

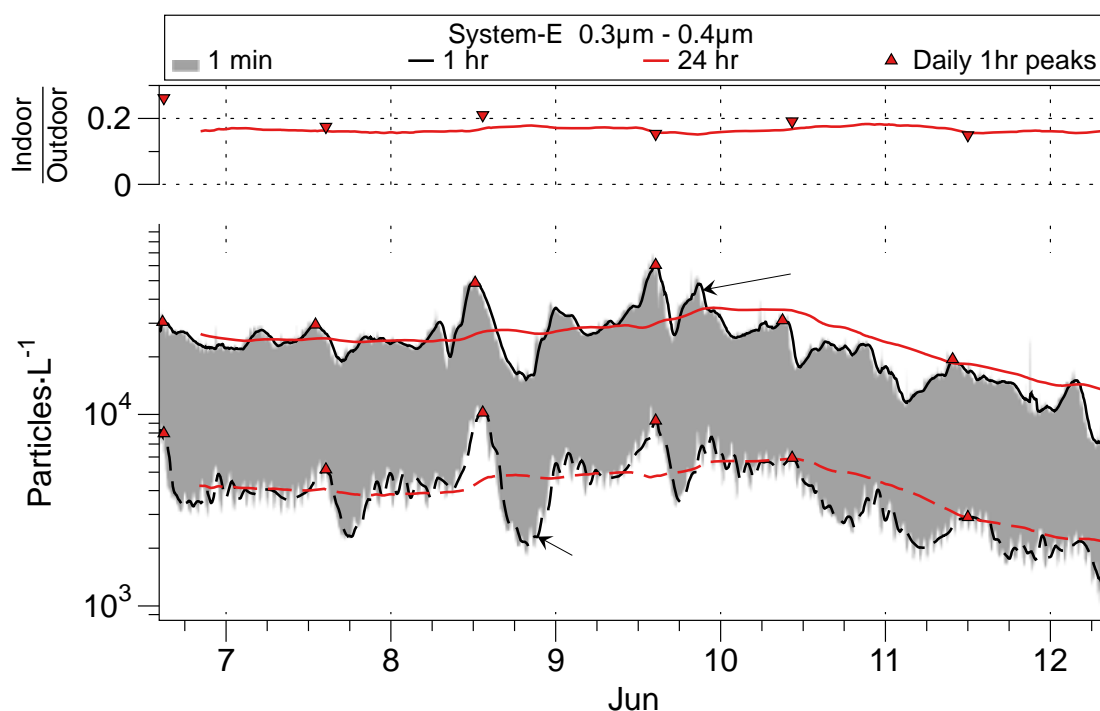


Figure SU-1-E-7. Number concentrations of 0.3–0.4 μm diameter particles measured outdoors and indoors during operation of System E, June 6-12, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-1-E-3.

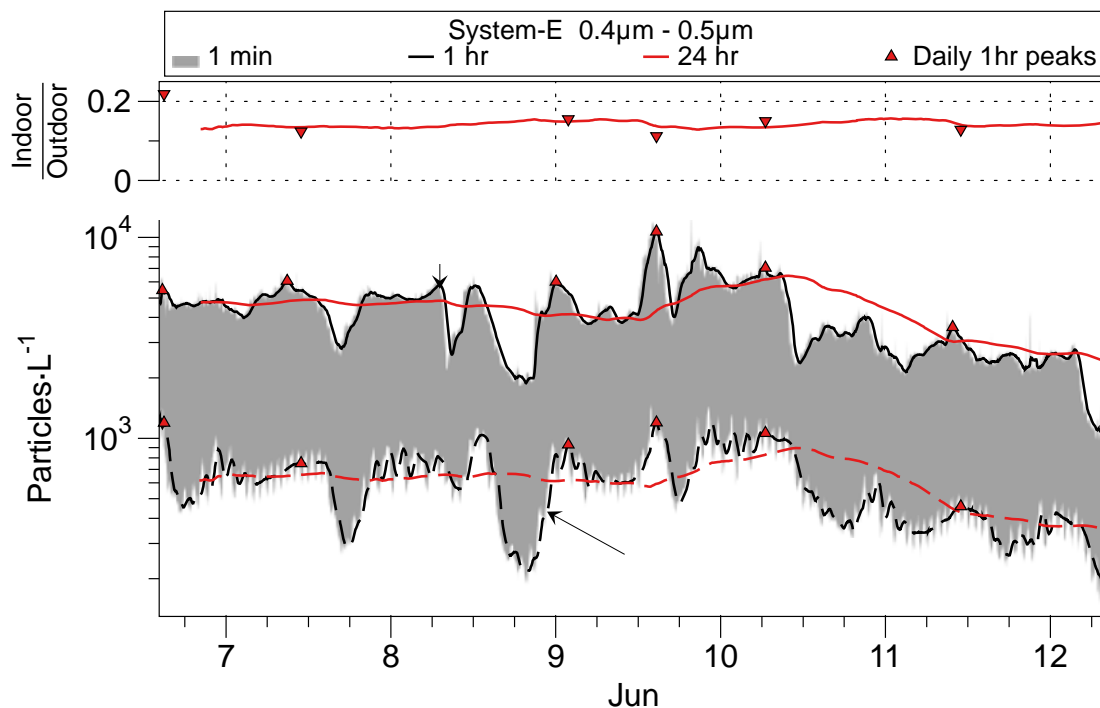


Figure SU-1-E-8. Number concentrations of 0.4–0.5 μm diameter particles measured outdoors and indoors during operation of System E, June 6-12, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-1-E-3.

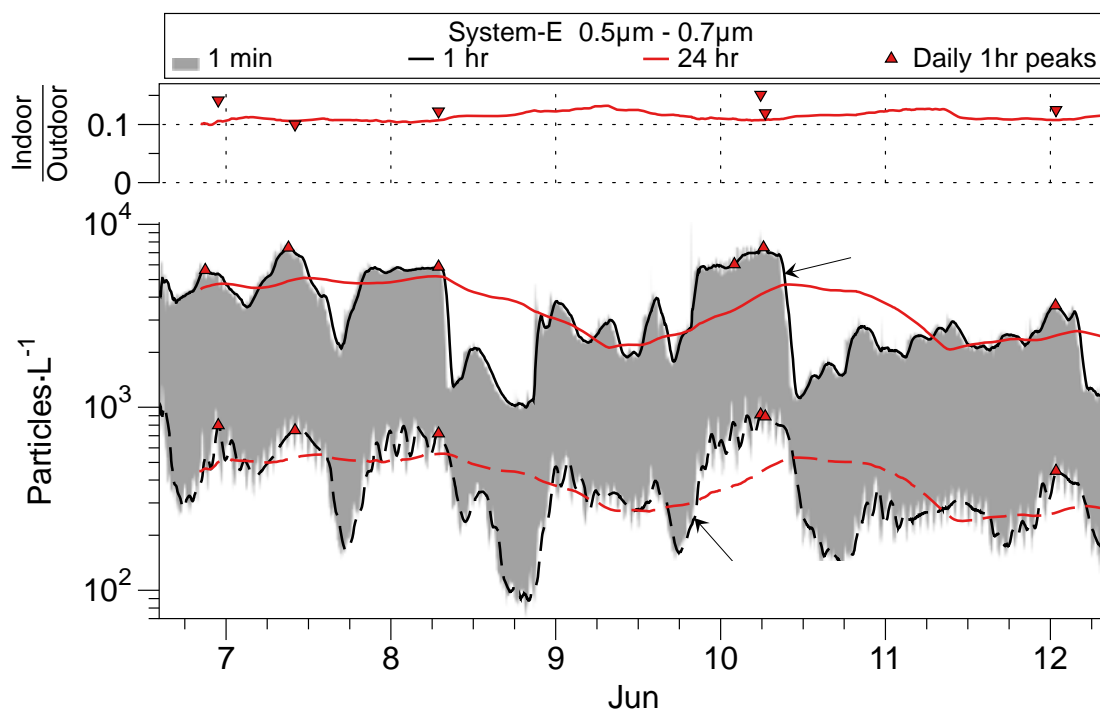


Figure SU-1-E-9. Number concentrations of 0.5–0.7 μm diameter particles measured outdoors and indoors during operation of System E, June 6-12, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-1-E-3.

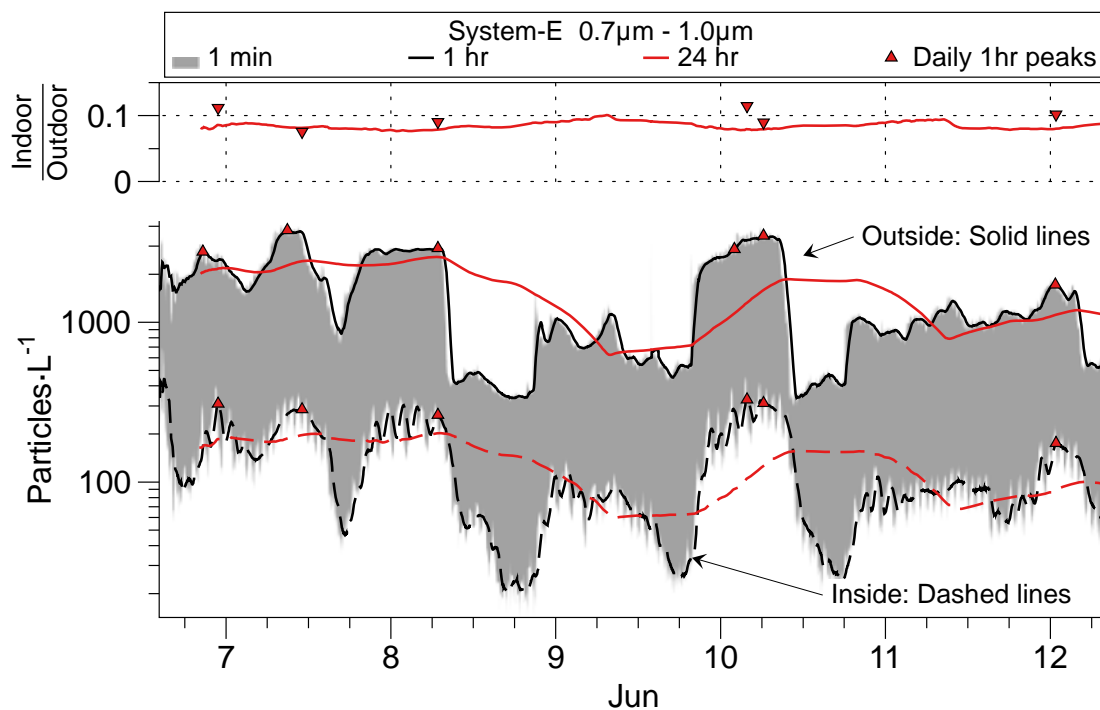


Figure SU-1-E-10. Number concentrations of 0.7–1.0 μm diameter particles measured outdoors and indoors during operation of System E, June 6-12, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-1-E-3.

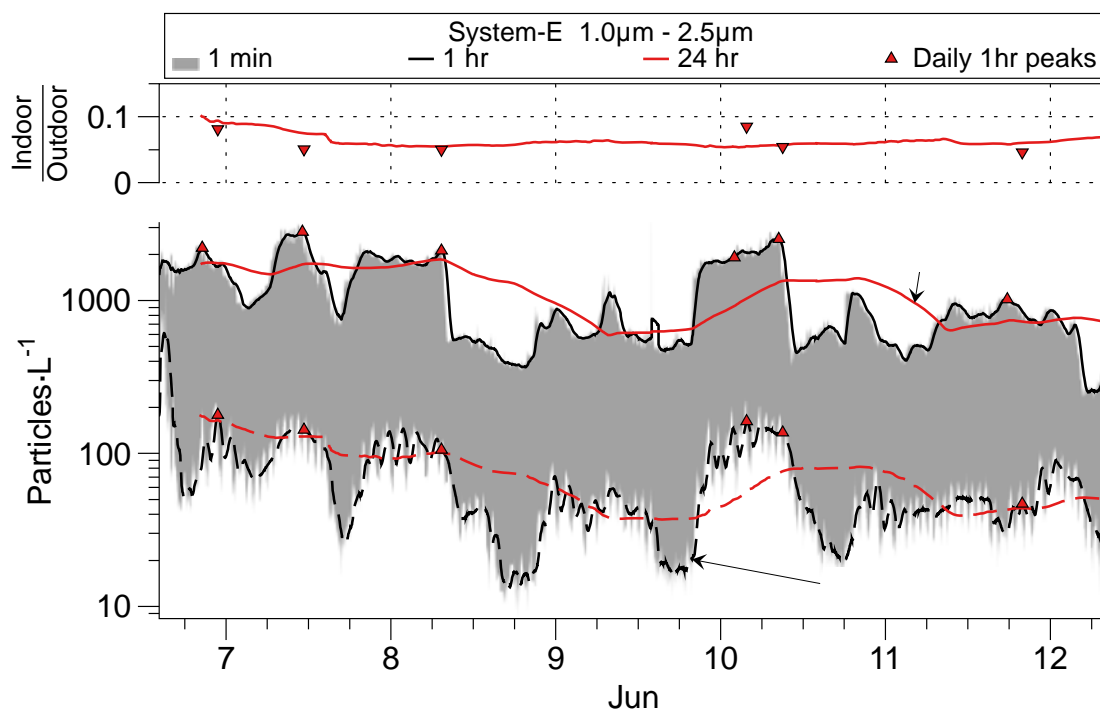


Figure SU-1-E-11. Number concentrations of 1.0–2.5 μm diameter particles measured outdoors and indoors during operation of System E, June 6-12, 2014. Data collected using MetOne BT637S particle counters. Refer to Figure SU-1-E-3 for details.

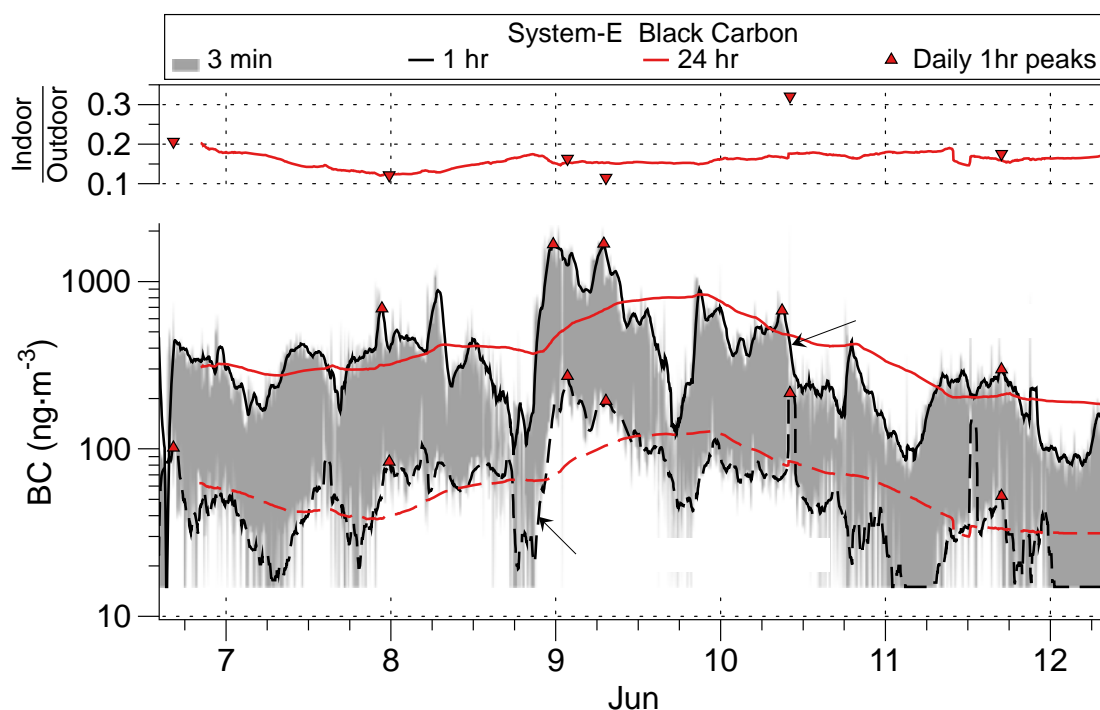


Figure SU-1-E-12. Black carbon concentrations measured outdoors and indoors during operation of System E, June 6-12, 2014. Data collected using AE22 Aethalometers with 3-min samples. Data otherwise as described in Figure SU-1-E-3 caption.

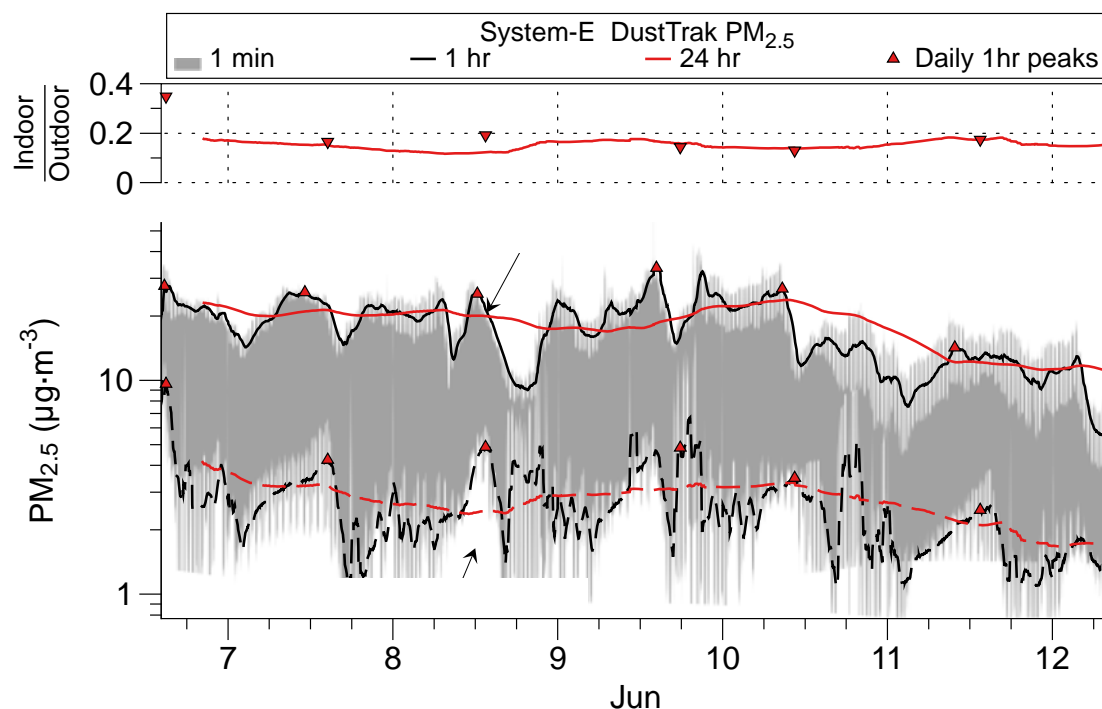


Figure SU-1-E-13. PM_{2.5} reported by TSI DustTrak II 8530 measurements outdoors and indoors during operation of System E, June 6-12, 2014. The DustTrak measures light scattering and uses a calibration to estimate PM_{2.5} mass. Refer to “Guide” before Figure SU-1-E-3.

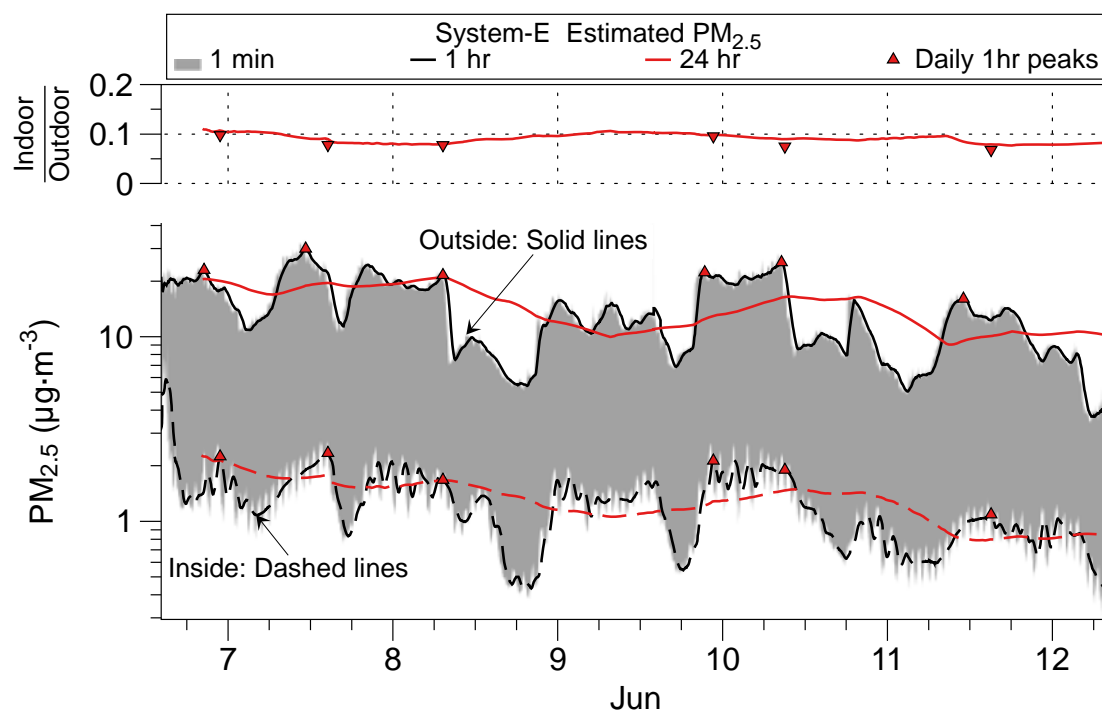


Figure SU-1-E-14. Estimated PM_{2.5} concentration calculated from size-resolved particle number concentrations measured by MetOne and CPC during operation of System E, June 6-12, 2014. Details provided in body of report. Refer to “Guide” before Figure SU-1-E-3.

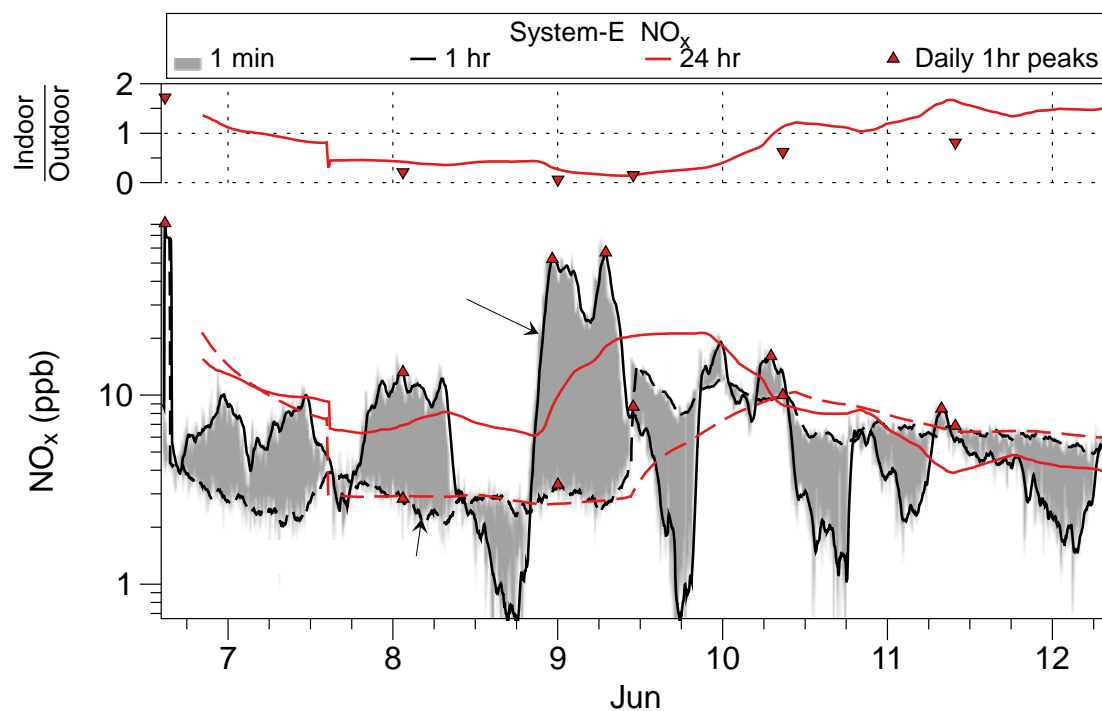


Figure SU-1-E-15. Nitrogen oxides concentrations measured outdoors and indoors during operation of System E, June 6-12, 2014. Data collected using API 200A and 200E chemiluminescence analyzers.

Table SU-1-E-2. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 6 nm to 2.5 µm measured using the TSI 3787 CPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Mean ¹	SD ¹
Outdoor 24h mean	1.3E+4	1.4E+4	6.7E+3	1.0E+4	1.1E+4	1.8E+4	1.2E+4	3.5E+3
Outdoor 24h SD	4.2E+3	8.4E+3	3.8E+3	4.3E+3	5.2E+3	1.5E+4	6.8E+3	4.0E+3
Indoor 24h mean	1.0E+3	1.0E+3	5.7E+2	8.1E+2	7.7E+2	8.7E+2	8.4E+2	1.6E+2
Indoor 24h SD	4.2E+2	5.9E+2	2.6E+2	3.1E+2	3.3E+2	6.4E+2	4.3E+2	1.4E+2
24h mean In/Out	0.09	0.07	0.08	0.08	0.07	0.06	0.07	0.01
Highest 8h Outdoor	2.0E+4	2.3E+4	1.2E+4	1.3E+4	1.3E+4	3.5E+4	2.0E+4	8.1E+3
Highest 8h Indoor	2.3E+3	1.5E+3	1.0E+3	1.0E+3	9.1E+2	1.6E+3	1.4E+3	4.8E+2
Highest 8 h In/Out	0.11	0.07	0.08	0.07	0.07	0.05	0.08	0.02
Highest 1h Outdoor	2.0E+4	3.5E+4	1.6E+4	1.6E+4	2.3E+4	4.9E+4	2.6E+4	1.2E+4
Highest 1h Indoor ²	2.3E+3	1.5E+3	1.0E+3	1.0E+3	9.1E+2	1.6E+3	1.7E+3	5.8E+2
Highest 1h In/Out	0.11	0.07	0.08	0.06	0.05	0.04	0.07	0.02
Time of highest 1h Outdoor	6/6/14 14:02	6/7/14 11:30	6/9/14 0:32	6/9/14 6:07	6/10/14 19:11	6/11/14 11:04		
Corresponding highest 1h Indoor	6/6/14 14:17	6/7/14 14:29	6/9/14 1:47	6/9/14 7:08	6/10/14 20:08	6/11/14 13:18		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/6/2014 20:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-1-E-3. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 100 nm to 2.5 µm measured using the TSI 3781 CPC with size selector.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Mean ¹	SD ¹
Outdoor 24h mean	7.4E+2	8.3E+2	6.4E+2	8.1E+2	4.9E+2	3.1E+2	6.3E+2	1.9E+2
Outdoor 24h SD	3.9E+2	4.3E+2	2.8E+2	2.9E+2	1.9E+2	2.1E+2	3.0E+2	8.8E+1
Indoor 24h mean	1.2E+2	1.0E+2	8.3E+1	1.1E+2	6.8E+1	4.1E+1	8.7E+1	2.7E+1
Indoor 24h SD	5.2E+1	5.0E+1	3.3E+1	4.3E+1	2.2E+1	2.0E+1	3.7E+1	1.2E+1
24h mean In/Out	0.22	0.14	0.13	0.13	0.14	0.13	0.15	0.03
Highest 8h Outdoor	1.6E+3	1.3E+3	9.2E+2	1.1E+3	7.1E+2	5.5E+2	1.0E+3	3.5E+2
Highest 8h Indoor	2.6E+2	1.5E+2	1.2E+2	1.4E+2	9.2E+1	6.5E+1	1.4E+2	6.0E+1
Highest 8 h In/Out	0.16	0.11	0.13	0.13	0.13	0.12	0.13	0.02
Highest 1h Outdoor	1.6E+3	1.6E+3	1.3E+3	1.3E+3	9.3E+2	8.1E+2	1.3E+3	3.1E+2
Highest 1h Indoor ²	2.6E+2	1.5E+2	1.2E+2	1.4E+2	9.2E+1	6.5E+1	1.6E+2	6.5E+1
Highest 1h In/Out	0.16	0.13	0.14	0.10	0.09	0.10	0.12	0.03
Time of highest 1h Outdoor	6/6/14 14:17	6/7/14 13:38	6/9/14 0:55	6/9/14 21:03	6/10/14 19:05	6/11/14 16:54		
Corresponding highest 1h Indoor	6/6/14 14:17	6/7/14 14:37	6/9/14 1:58	6/9/14 22:39	6/10/14 19:49	6/11/14 16:54		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/6/2014 20:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-1-E-4. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 6–100 nm based on difference between concentrations measured using the TSI 3787 CPC and the TSI 3781 CPC with size selector.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Mean ¹	SD ¹
Outdoor 24h mean	1.2E+4	1.4E+4	6.1E+3	9.4E+3	1.0E+4	1.8E+4	1.2E+4	3.6E+3
Outdoor 24h SD	4.0E+3	8.1E+3	3.6E+3	4.1E+3	5.0E+3	1.5E+4	6.6E+3	4.0E+3
Indoor 24h mean	9.2E+2	9.2E+2	4.8E+2	7.0E+2	7.0E+2	8.3E+2	7.6E+2	1.5E+2
Indoor 24h SD	3.7E+2	5.5E+2	2.3E+2	2.7E+2	3.1E+2	6.2E+2	4.0E+2	1.4E+2
24h mean In/Out	0.08	0.07	0.08	0.07	0.07	0.05	0.07	0.01
Highest 8h Outdoor	1.9E+4	2.2E+4	1.1E+4	1.2E+4	1.3E+4	3.5E+4	1.9E+4	8.3E+3
Highest 8h Indoor	2.0E+3	1.4E+3	8.9E+2	8.7E+2	8.4E+2	1.6E+3	1.3E+3	4.4E+2
Highest 8 h In/Out	0.11	0.06	0.08	0.07	0.07	0.04	0.07	0.02
Highest 1h Outdoor	1.9E+4	3.4E+4	1.4E+4	1.5E+4	2.2E+4	4.8E+4	2.6E+4	1.2E+4
Highest 1h Indoor ²	2.0E+3	1.4E+3	8.9E+2	8.7E+2	8.4E+2	1.6E+3	1.5E+3	5.5E+2
Highest 1h In/Out	0.11	0.07	0.07	0.05	0.05	0.04	0.06	0.02
Time of highest 1h Outdoor	6/6/14 14:56	6/7/14 11:30	6/9/14 0:32	6/9/14 6:07	6/10/14 19:37	6/11/14 11:04		
Corresponding highest 1h Indoor	6/6/14 14:56	6/7/14 14:28	6/9/14 1:45	6/9/14 7:08	6/10/14 20:09	6/11/14 13:18		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/6/2014 20:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-1-E-5. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 100–300 nm based on difference between concentrations measured using the TSI 3781 CPC with size selector and the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Mean ¹	SD ¹
Outdoor 24h mean	7.1E+5	7.9E+5	6.0E+5	7.6E+5	4.5E+5	2.9E+5	6.0E+5	1.8E+5
Outdoor 24h SD	3.9E+5	4.4E+5	2.7E+5	2.9E+5	1.9E+5	2.0E+5	3.0E+5	8.9E+4
Indoor 24h mean	1.1E+5	9.7E+4	7.8E+4	1.1E+5	6.2E+4	3.7E+4	8.2E+4	2.6E+4
Indoor 24h SD	4.7E+4	5.0E+4	3.2E+4	4.2E+4	2.2E+4	2.0E+4	3.5E+4	1.2E+4
24h mean In/Out	0.22	0.14	0.13	0.13	0.14	0.13	0.15	0.03
Highest 8h Outdoor	1.5E+6	1.3E+6	8.8E+5	1.0E+6	6.6E+5	5.3E+5	9.9E+5	3.5E+5
Highest 8h Indoor	2.4E+5	1.5E+5	1.2E+5	1.3E+5	8.4E+4	6.2E+4	1.3E+5	5.6E+4
Highest 8 h In/Out	0.15	0.11	0.13	0.13	0.13	0.12	0.13	0.01
Highest 1h Outdoor	1.5E+6	1.6E+6	1.2E+6	1.2E+6	9.0E+5	7.9E+5	1.2E+6	3.0E+5
Highest 1h Indoor ²	2.4E+5	1.5E+5	1.2E+5	1.3E+5	8.4E+4	6.2E+4	1.5E+5	6.1E+4
Highest 1h In/Out	0.15	0.13	0.14	0.10	0.09	0.10	0.12	0.02
Time of highest 1h Outdoor	6/6/14 14:17	6/7/14 13:39	6/9/14 0:55	6/9/14 21:02	6/10/14 19:05	6/11/14 16:54		
Corresponding highest 1h Indoor	6/6/14 14:32	6/7/14 14:37	6/9/14 1:58	6/9/14 22:40	6/10/14 19:49	6/11/14 16:54		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/6/2014 20:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-1-E-6. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.3–0.4 µm measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Mean ¹	SD ¹
Outdoor 24h mean	2.4E+4	2.4E+4	2.8E+4	3.5E+4	2.3E+4	1.4E+4	2.5E+4	6.3E+3
Outdoor 24h SD	2.8E+3	2.6E+3	9.3E+3	9.5E+3	4.8E+3	2.6E+3	5.2E+3	3.0E+3
Indoor 24h mean	4.1E+3	3.9E+3	4.8E+3	5.7E+3	4.1E+3	2.3E+3	4.1E+3	1.0E+3
Indoor 24h SD	1.2E+3	8.1E+2	2.2E+3	1.4E+3	1.2E+3	4.3E+2	1.2E+3	5.6E+2
24h mean In/Out	0.18	0.16	0.17	0.16	0.17	0.16	0.17	0.01
Highest 8h Outdoor	3.0E+4	2.6E+4	3.5E+4	4.3E+4	3.5E+4	1.9E+4	3.2E+4	7.7E+3
Highest 8h Indoor	8.0E+3	4.2E+3	6.8E+3	5.9E+3	6.0E+3	3.1E+3	5.7E+3	1.6E+3
Highest 8 h In/Out	0.26	0.16	0.19	0.14	0.17	0.16	0.18	0.04
Highest 1h Outdoor	3.0E+4	3.0E+4	4.9E+4	6.0E+4	3.1E+4	1.9E+4	3.7E+4	1.4E+4
Highest 1h Indoor ²	8.0E+3	4.2E+3	6.8E+3	5.9E+3	6.0E+3	3.1E+3	6.9E+3	2.5E+3
Highest 1h In/Out	0.26	0.17	0.21	0.15	0.19	0.15	0.19	0.04
Time of highest 1h Outdoor	6/6/14 14:46	6/7/14 13:02	6/8/14 12:16	6/9/14 14:32	6/10/14 9:01	6/11/14 9:46		
Corresponding highest 1h Indoor	6/6/14 14:57	6/7/14 14:32	6/8/14 13:22	6/9/14 14:32	6/10/14 10:24	6/11/14 12:00		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/6/2014 20:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-1-E-7. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.4–0.5 µm measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Mean ¹	SD ¹
Outdoor 24h mean	4.7E+3	4.8E+3	4.1E+3	5.7E+3	4.2E+3	2.6E+3	4.3E+3	9.3E+2
Outdoor 24h SD	3.8E+2	8.1E+2	1.4E+3	2.0E+3	1.6E+3	3.5E+2	1.1E+3	6.1E+2
Indoor 24h mean	6.5E+2	6.3E+2	6.2E+2	7.8E+2	6.4E+2	3.7E+2	6.1E+2	1.2E+2
Indoor 24h SD	2.0E+2	1.7E+2	2.5E+2	2.2E+2	2.7E+2	6.9E+1	2.0E+2	6.5E+1
24h mean In/Out	0.15	0.14	0.14	0.14	0.14	0.14	0.14	0.00
Highest 8h Outdoor	5.5E+3	5.4E+3	5.2E+3	7.3E+3	6.8E+3	3.2E+3	5.6E+3	1.3E+3
Highest 8h Indoor	1.2E+3	7.3E+2	7.6E+2	8.3E+2	9.8E+2	4.5E+2	8.2E+2	2.3E+2
Highest 8 h In/Out	0.22	0.14	0.15	0.11	0.14	0.14	0.15	0.03
Highest 1h Outdoor	5.5E+3	6.1E+3	6.0E+3	1.1E+4	7.1E+3	3.6E+3	6.5E+3	2.2E+3
Highest 1h Indoor ²	1.2E+3	7.3E+2	7.6E+2	8.3E+2	9.8E+2	4.5E+2	9.3E+2	2.6E+2
Highest 1h In/Out	0.22	0.12	0.15	0.11	0.15	0.13	0.15	0.03
Time of highest 1h Outdoor	6/6/14 14:45	6/7/14 8:55	6/9/14 0:03	6/9/14 14:40	6/10/14 6:31	6/11/14 9:47		
Corresponding highest 1h Indoor	6/6/14 14:59	6/7/14 10:55	6/9/14 1:49	6/9/14 14:40	6/10/14 6:31	6/11/14 10:58		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/6/2014 20:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-1-E-8. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.5–0.7 µm measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Mean ¹	SD ¹
Outdoor 24h mean	4.6E+3	5.0E+3	2.9E+3	3.4E+3	3.4E+3	2.5E+3	3.6E+3	8.8E+2
Outdoor 24h SD	6.9E+2	1.4E+3	1.8E+3	1.6E+3	2.3E+3	4.3E+2	1.4E+3	6.4E+2
Indoor 24h mean	5.1E+2	5.2E+2	3.5E+2	3.7E+2	4.2E+2	2.8E+2	4.1E+2	8.7E+1
Indoor 24h SD	2.1E+2	1.9E+2	2.2E+2	1.7E+2	2.9E+2	7.7E+1	1.9E+2	6.2E+1
24h mean In/Out	0.12	0.11	0.11	0.12	0.11	0.11	0.12	0.01
Highest 8h Outdoor	5.1E+3	6.1E+3	5.7E+3	5.2E+3	6.8E+3	2.8E+3	5.3E+3	1.2E+3
Highest 8h Indoor	1.0E+3	6.6E+2	6.7E+2	7.3E+2	8.1E+2	3.6E+2	7.1E+2	1.9E+2
Highest 8 h In/Out	0.20	0.11	0.12	0.14	0.12	0.13	0.14	0.03
Highest 1h Outdoor	5.6E+3	7.5E+3	5.9E+3	6.1E+3	7.5E+3	3.6E+3	6.0E+3	1.3E+3
Highest 1h Indoor ²	1.0E+3	6.6E+2	6.7E+2	7.3E+2	8.1E+2	3.6E+2	7.5E+2	1.5E+2
Highest 1h In/Out	0.14	0.10	0.12	0.15	0.12	0.12	0.13	0.02
Time of highest 1h Outdoor	6/6/14 20:58	6/7/14 9:05	6/8/14 6:56	6/10/14 2:00	6/10/14 6:15	6/12/14 0:45		
Corresponding highest 1h Indoor	6/6/14 22:53	6/7/14 10:02	6/8/14 6:56	6/10/14 5:50	6/10/14 6:30	6/12/14 0:50		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/6/2014 20:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-1-E-9. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.7–1.0 µm measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Mean ¹	SD ¹
Outdoor 24h mean	2.1E+3	2.4E+3	1.1E+3	1.1E+3	1.4E+3	1.1E+3	1.6E+3	5.2E+2
Outdoor 24h SD	4.3E+2	8.2E+2	9.9E+2	8.2E+2	1.2E+3	2.3E+2	7.5E+2	3.3E+2
Indoor 24h mean	1.9E+2	1.9E+2	1.0E+2	9.0E+1	1.3E+2	9.4E+1	1.3E+2	4.1E+1
Indoor 24h SD	1.0E+2	8.1E+1	8.6E+1	6.8E+1	1.1E+2	3.4E+1	8.1E+1	2.5E+1
24h mean In/Out	0.11	0.08	0.08	0.09	0.08	0.08	0.09	0.01
Highest 8h Outdoor	2.4E+3	3.1E+3	2.8E+3	2.0E+3	3.2E+3	1.3E+3	2.5E+3	6.6E+2
Highest 8h Indoor	4.4E+2	2.4E+2	2.4E+2	2.5E+2	2.8E+2	1.4E+2	2.7E+2	9.1E+1
Highest 8 h In/Out	0.19	0.08	0.09	0.12	0.09	0.10	0.11	0.04
Highest 1h Outdoor	2.8E+3	3.8E+3	2.9E+3	2.9E+3	3.5E+3	1.7E+3	2.9E+3	6.5E+2
Highest 1h Indoor ²	4.4E+2	2.4E+2	2.4E+2	2.5E+2	2.8E+2	1.4E+2	2.8E+2	5.1E+1
Highest 1h In/Out	0.11	0.08	0.09	0.11	0.09	0.10	0.10	0.01
Time of highest 1h Outdoor	6/6/14 20:38	6/7/14 8:56	6/8/14 6:51	6/10/14 2:00	6/10/14 6:15	6/12/14 0:44		
Corresponding highest 1h Indoor	6/6/14 22:50	6/7/14 11:04	6/8/14 6:51	6/10/14 3:51	6/10/14 6:15	6/12/14 0:50		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/6/2014 20:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-1-E-10. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 1.0–2.5 µm measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Mean ¹	SD ¹
Outdoor 24h mean	1.7E+3	1.7E+3	8.7E+2	9.2E+2	1.1E+3	7.6E+2	1.2E+3	3.8E+2
Outdoor 24h SD	3.0E+2	6.0E+2	5.7E+2	5.8E+2	7.3E+2	1.7E+2	4.9E+2	1.9E+2
Indoor 24h mean	1.5E+2	9.5E+1	5.4E+1	5.0E+1	7.0E+1	4.9E+1	7.7E+1	3.5E+1
Indoor 24h SD	1.7E+2	4.1E+1	3.7E+1	3.4E+1	5.0E+1	1.8E+1	5.9E+1	5.3E+1
24h mean In/Out	0.14	0.07	0.06	0.06	0.06	0.06	0.08	0.03
Highest 8h Outdoor	1.8E+3	2.2E+3	1.9E+3	1.5E+3	2.2E+3	8.7E+2	1.7E+3	4.6E+2
Highest 8h Indoor	6.1E+2	1.3E+2	1.2E+2	1.2E+2	1.4E+2	5.1E+1	1.9E+2	1.9E+2
Highest 8 h In/Out	0.33	0.06	0.06	0.08	0.06	0.06	0.11	0.10
Highest 1h Outdoor	2.2E+3	2.8E+3	2.1E+3	1.9E+3	2.5E+3	1.0E+3	2.1E+3	5.6E+2
Highest 1h Indoor ²	6.1E+2	1.3E+2	1.2E+2	1.2E+2	1.4E+2	5.1E+1	1.3E+2	4.3E+1
Highest 1h In/Out	0.08	0.05	0.05	0.09	0.05	0.05	0.06	0.02
Time of highest 1h Outdoor	6/6/14 20:32	6/7/14 11:08	6/8/14 7:22	6/10/14 2:00	6/10/14 8:28	6/11/14 17:44		
Corresponding highest 1h Indoor	6/6/14 22:48	6/7/14 11:22	6/8/14 7:22	6/10/14 3:48	6/10/14 9:02	6/11/14 19:55		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/6/2014 20:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-1-E-11. Summary statistics for estimated PM_{2.5} concentrations (µg m⁻³) calculated from particle number concentrations resolved by size from 6 nm to 2.5 µm (as reported in Tables SU-1-E-2 to SU-1-E-9) and resulting indoor/outdoor ratios.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Mean ¹	SD ¹
Outdoor 24h mean	1.9E+1	2.0E+1	1.2E+1	1.4E+1	1.3E+1	1.0E+1	1.5E+1	3.4E+0
Outdoor 24h SD	3.0E+0	5.5E+0	5.1E+0	4.9E+0	6.2E+0	3.3E+0	4.7E+0	1.1E+0
Indoor 24h mean	1.9E+0	1.6E+0	1.1E+0	1.3E+0	1.2E+0	8.3E-1	1.3E+0	3.5E-1
Indoor 24h SD	1.4E+0	4.7E-1	4.8E-1	4.4E-1	5.1E-1	2.0E-1	5.8E-1	3.7E-1
24h mean In/Out	0.14	0.09	0.09	0.10	0.09	0.08	0.10	0.02
Highest 8h Outdoor	2.1E+1	2.5E+1	2.1E+1	1.8E+1	2.2E+1	1.4E+1	2.0E+1	3.4E+0
Highest 8h Indoor	5.9E+0	1.9E+0	1.8E+0	1.8E+0	1.9E+0	9.8E-1	2.4E+0	1.6E+0
Highest 8 h In/Out	0.28	0.08	0.08	0.10	0.09	0.07	0.12	0.07
Highest 1h Outdoor	2.3E+1	3.0E+1	2.2E+1	2.2E+1	2.5E+1	1.6E+1	2.3E+1	4.2E+0
Highest 1h Indoor ²	5.9E+0	1.9E+0	1.8E+0	1.8E+0	1.9E+0	9.8E-1	1.9E+0	4.2E-1
Highest 1h In/Out	0.10	0.08	0.08	0.10	0.08	0.07	0.08	0.01
Time of highest 1h Outdoor	6/6/14 20:30	6/7/14 11:18	6/8/14 7:16	6/9/14 21:24	6/10/14 8:35	6/11/14 11:04		
Corresponding highest 1h Indoor	6/6/14 22:51	6/7/14 14:32	6/8/14 7:16	6/9/14 22:39	6/10/14 9:04	6/11/14 15:04		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/6/2014 20:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-1-E-12. Summary statistics for concentrations of PM_{2.5} (µg m⁻³) and indoor /outdoor ratios from measurements reported by TSI DustTrak II.

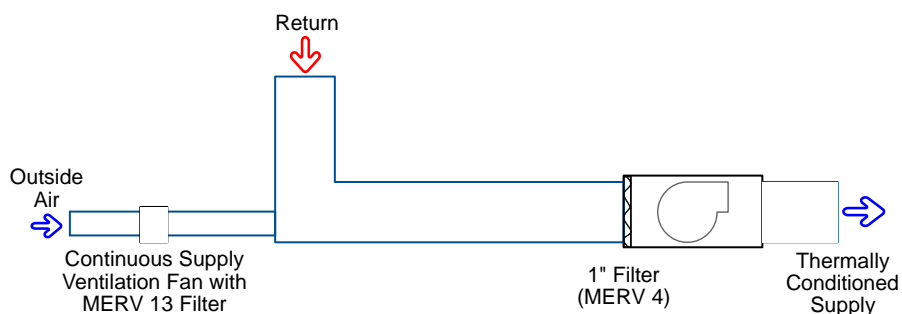
Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Mean ¹	SD ¹
Outdoor 24h mean	7.1E+5	7.9E+5	6.0E+5	7.6E+5	4.5E+5	2.9E+5	6.0E+5	1.8E+5
Outdoor 24h SD	3.9E+5	4.4E+5	2.7E+5	2.9E+5	1.9E+5	2.0E+5	3.0E+5	8.9E+4
Indoor 24h mean	1.1E+5	9.7E+4	7.8E+4	1.1E+5	6.2E+4	3.7E+4	8.2E+4	2.6E+4
Indoor 24h SD	4.7E+4	5.0E+4	3.2E+4	4.2E+4	2.2E+4	2.0E+4	3.5E+4	1.2E+4
24h mean In/Out	0.22	0.14	0.13	0.13	0.14	0.13	0.15	0.03
Highest 8h Outdoor	1.5E+6	1.3E+6	8.8E+5	1.0E+6	6.6E+5	5.3E+5	9.9E+5	3.5E+5
Highest 8h Indoor	2.4E+5	1.5E+5	1.2E+5	1.3E+5	8.4E+4	6.2E+4	1.3E+5	5.6E+4
Highest 8 h In/Out	0.15	0.11	0.13	0.13	0.13	0.12	0.13	0.01
Highest 1h Outdoor	1.5E+6	1.6E+6	1.2E+6	1.2E+6	9.0E+5	7.9E+5	1.2E+6	3.0E+5
Highest 1h Indoor ²	2.4E+5	1.5E+5	1.2E+5	1.3E+5	8.4E+4	6.2E+4	1.5E+5	6.1E+4
Highest 1h In/Out	0.15	0.13	0.14	0.10	0.09	0.10	0.12	0.02
Time of highest 1h Outdoor	6/6/14 14:17	6/7/14 13:39	6/9/14 0:55	6/9/14 21:02	6/10/14 19:05	6/11/14 16:54		
Corresponding highest 1h Indoor	6/6/14 14:32	6/7/14 14:37	6/9/14 1:58	6/9/14 22:40	6/10/14 19:49	6/11/14 16:54		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/6/2014 20:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-1-E-13. Daily¹ summary statistics for concentrations (ng m⁻³) and indoor /outdoor ratios of aerosol black carbon measured using the Aethalometer AE22.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Mean ¹	SD ¹
Outdoor 24h mean	3.1E+2	3.4E+2	5.5E+2	6.8E+2	3.1E+2	1.9E+2	4.0E+2	1.6E+2
Outdoor 24h SD	1.3E+2	1.4E+2	4.8E+2	4.0E+2	1.7E+2	8.9E+1	2.3E+2	1.5E+2
Indoor 24h mean	5.5E+1	4.2E+1	8.4E+1	1.1E+2	5.5E+1	3.1E+1	6.3E+1	2.7E+1
Indoor 24h SD	2.8E+1	2.7E+1	6.0E+1	5.2E+1	1.1E+2	5.2E+1	5.4E+1	2.6E+1
24h mean In/Out	0.28	0.15	0.15	0.15	0.17	0.17	0.18	0.05
Highest 8h Outdoor	4.9E+2	4.4E+2	9.0E+2	1.3E+3	5.6E+2	2.5E+2	6.6E+2	3.4E+2
Highest 8h Indoor	8.8E+1	7.4E+1	1.8E+2	1.9E+2	8.1E+1	5.2E+1	1.1E+2	5.2E+1
Highest 8 h In/Out	0.18	0.17	0.20	0.14	0.14	0.20	0.17	0.02
Highest 1h Outdoor	4.9E+2	6.9E+2	1.7E+3	1.7E+3	6.7E+2	3.0E+2	9.2E+2	5.5E+2
Highest 1h Indoor ²	8.8E+1	7.4E+1	1.8E+2	1.9E+2	8.1E+1	5.2E+1	1.5E+2	7.9E+1
Highest 1h In/Out	0.21	0.12	0.16	0.12	0.32	0.18	0.18	0.07
Time of highest 1h Outdoor	6/6/14 14:06	6/7/14 22:42	6/8/14 23:39	6/9/14 7:00	6/10/14 8:57	6/11/14 16:54		
Corresponding highest 1h Indoor	6/6/14 16:21	6/7/14 23:45	6/9/14 1:42	6/9/14 7:18	6/10/14 10:06	6/11/14 16:54		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/6/2014 20:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Appendix SU-2-A. Results for System A, June 12-17, 2014.**Table SU-2-A-1. Description of System A component characteristics during the period of June 12-17, 2014.**

System Parameter	Description or Measured Value
Heating	75,000 BTU/h, 80% eff., gas furnace, 1-stage burner
Cooling	3 ton, SEER13 air conditioner
Thermal distribution	Central fan with PSC motor: 1200 cfm for cooling, 1074 cfm for heating
Ventilation	Supply fan discharging into the return plenum. Set to 38 cfm continuous
Filtration	MERV4, 1" (Purolator F312) filter installed inside the FAU cabinet. A MERV13, 2" (AirGaurd DPgreen13) installed where the continuous supply air discharges into the return plenum.
Recirculation blower schedule	As required for thermal conditioning, no fan cyclers.
VOC removal system	None

Notes about this monitoring period

We lost one of the CPC 3781 instruments near the beginning of the operational period. The CPC 3781 indoor / outdoor data stream was constructed from the single remaining instrument. All other instruments were fine.

The 24 h running statistics in the figures starts at 6/13/2014 04:30.

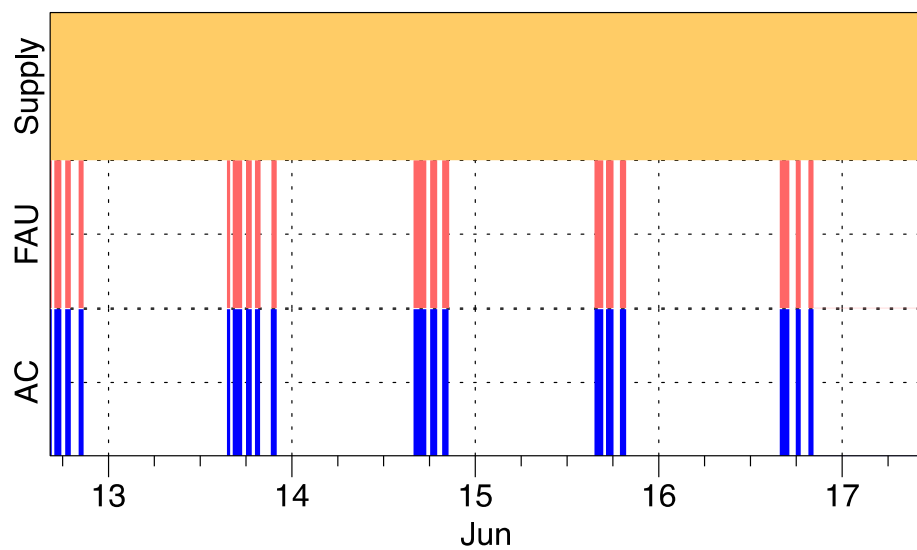


Figure SU-2-A-1. Operation of mechanical systems: Supply fan; fan on central forced air unit (FAU); central air-conditioning (AC).

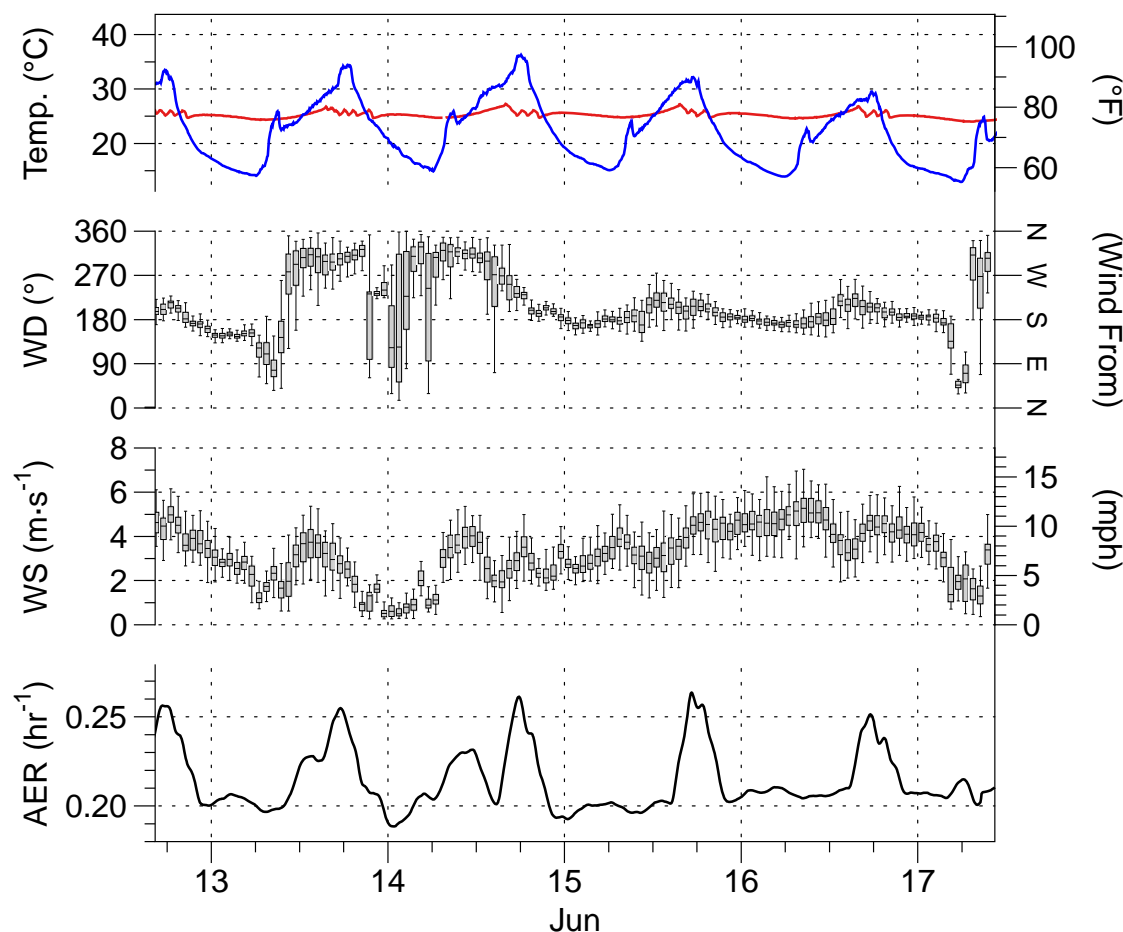


Figure SU-2-A-2. Environmental parameters measured during operation of System A, June 12-17, 2014. From top to bottom: indoor (red) and outdoor (blue) temperatures, wind direction (WD) in units of degrees from North, wind speed (WS), and air exchange rate (AER). For WD and WS, the box for each hour shows the 25th, 50th and 75th percentiles of the measured values and whiskers extend 1.5X the interquartile range (75th–25th percentile values) above the 75th and below the 25th percentile values.

Guide to plots of pollutant concentration time series and indoor / outdoor (I/O) ratios

The bottom section of each plot shows outdoor and indoor time series using the resolution of data collection: 3-min for black carbon and 1-min for all other parameters. The top and bottom of grey band are LOESS-smoothed, 1-min (or 3-min for black carbon) time-series. Also shown are time series with 1h and 24h time averaging for most pollutants and 1h and 8h average for ozone. Triangles in bottom of plot indicate the highest 1h outdoor and corresponding highest 1h indoor average during each day. The top section of each plot shows the ratio of indoor to outdoor running 24h mean values (8h for ozone) and the ratios of highest 1h indoor to corresponding highest 1h outdoor concentration each day.

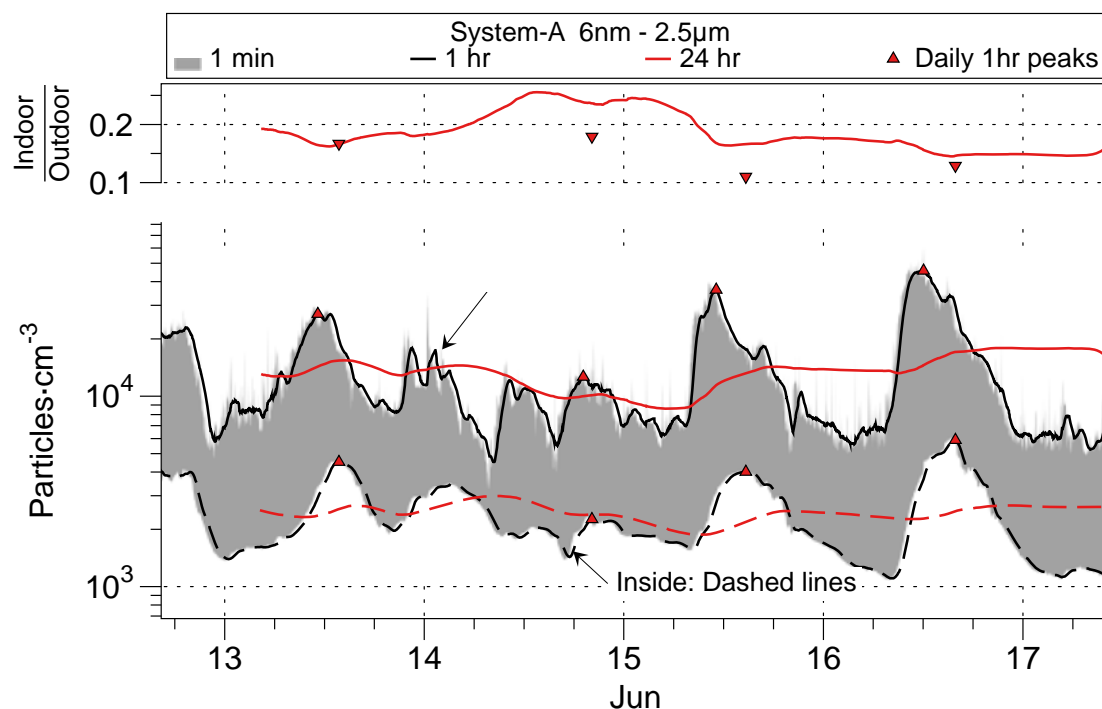


Figure SU-2-A-3. Number concentrations of 6 nm to 2.5 μm diameter particles measured outdoors and indoors during operation of System A, June 12-17, 2014. Data collected using TSI 3787 CPCs.

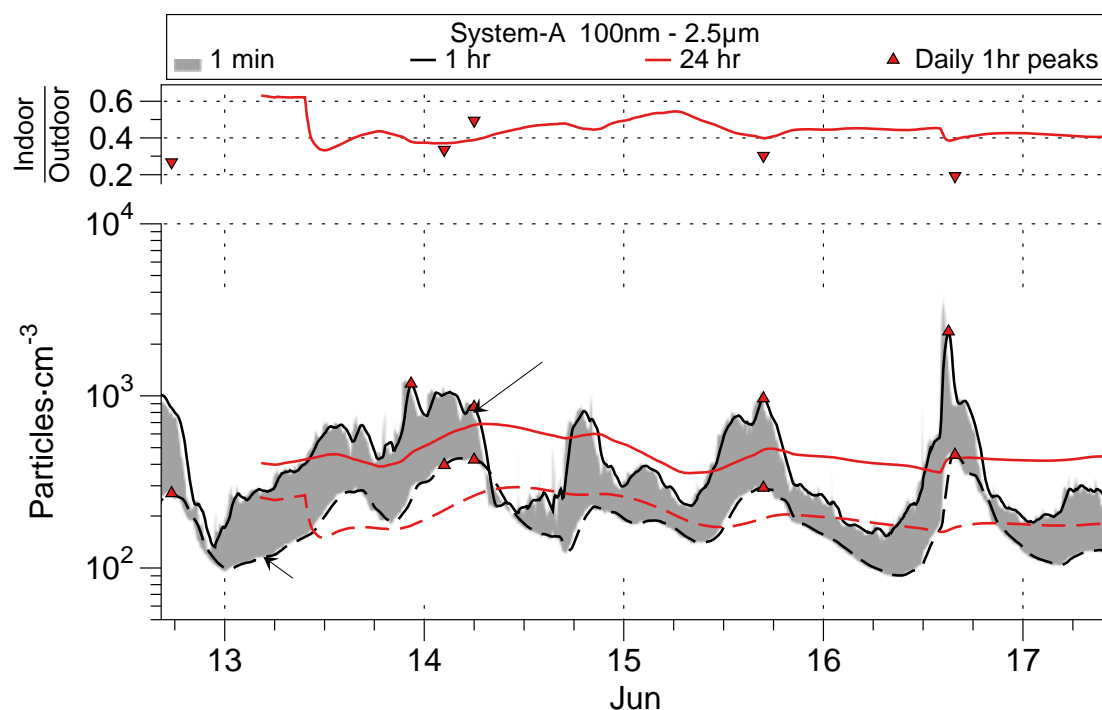


Figure SU-2-A-4. Number concentrations of 100 nm to 2.5 μm diameter particles measured outdoors and indoors during operation of System A, June 12-17, 2014. Data collected using TSI 3781 CPCs outfitted with screens to exclude particles smaller than 100 nm. Refer to “Guide” before Figure SU-2-A-3.

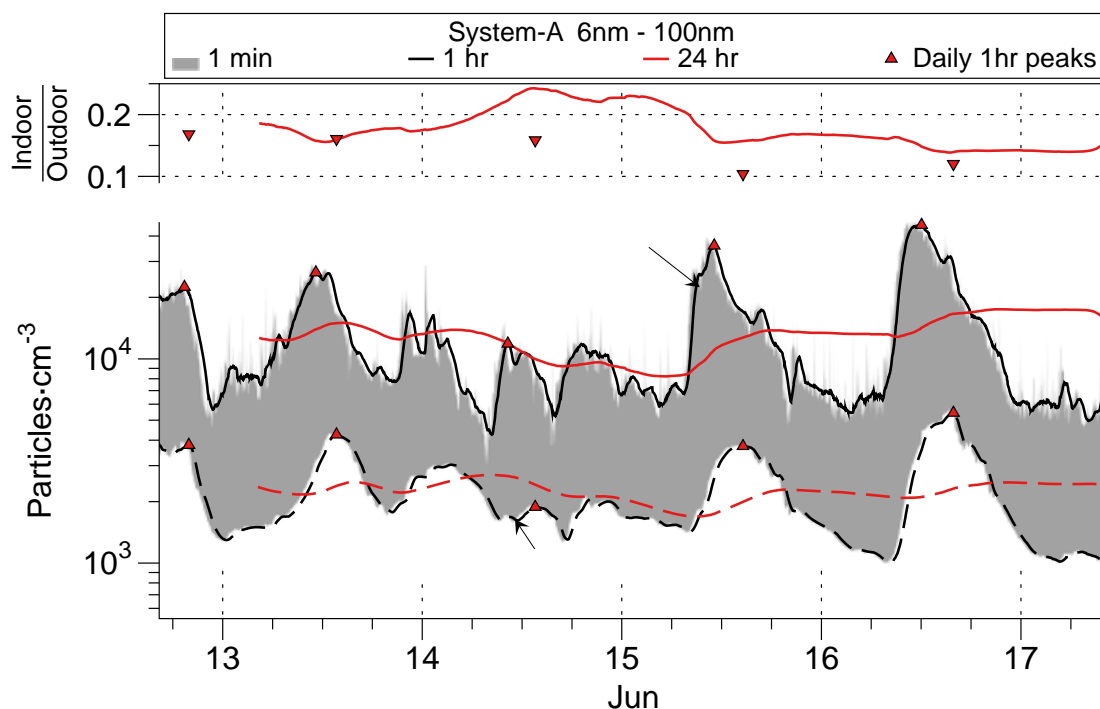


Figure SU-2-A-5. Number concentrations of 6–100 nm diameter particles measured outdoors and indoors during operation of System A, June 12-17, 2014. Data obtained as the difference between time series show in prior two figures. Refer to “Guide” before Figure SU-2-A-3.

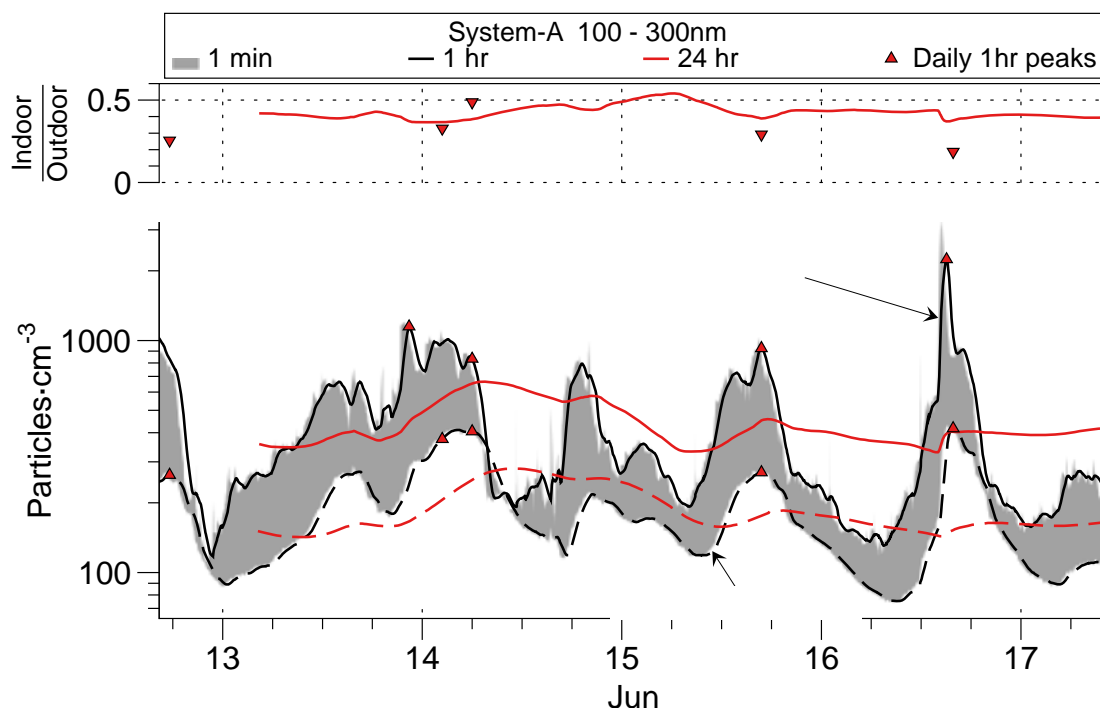


Figure SU-2-A-6. Number concentrations of 100–300 nm diameter particles measured outdoors and indoors during operation of System A, June 12-17, 2014. Data obtained as the difference between the TSI 3781 CPC with size selector and the MetOne BT637S OPC. Refer to “Guide” before Figure SU-2-A-3.

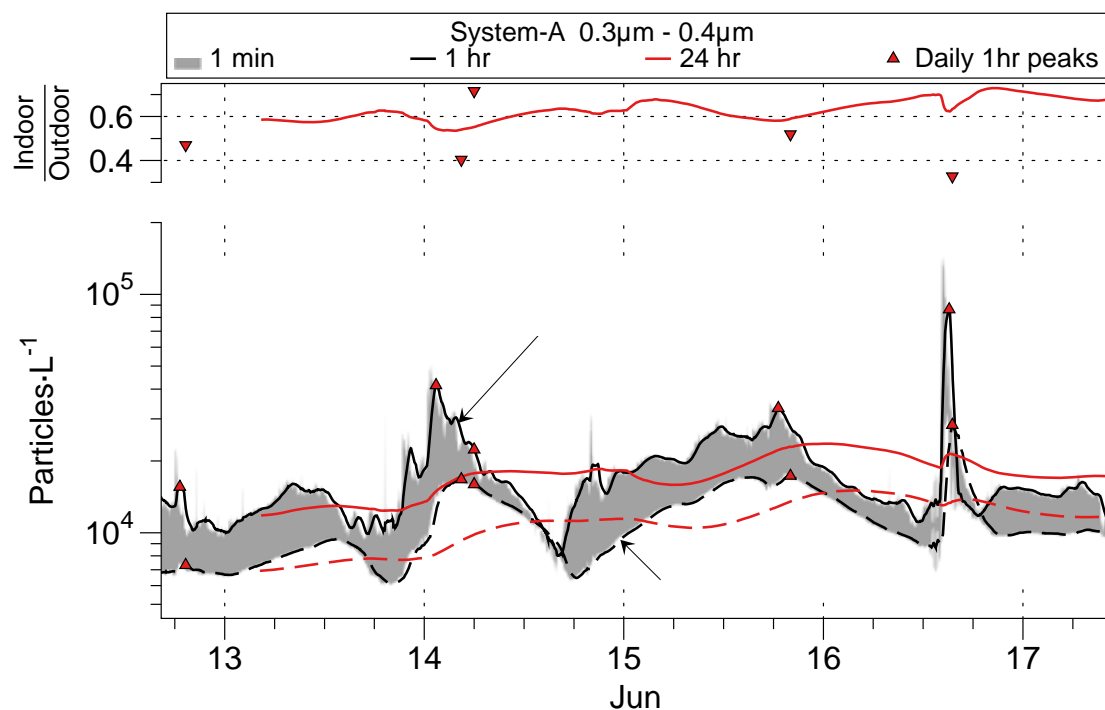


Figure SU-2-A-7. Number concentrations of 0.3–0.4 μm diameter particles measured outdoors and indoors during operation of System A, June 12-17, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-2-A-3.

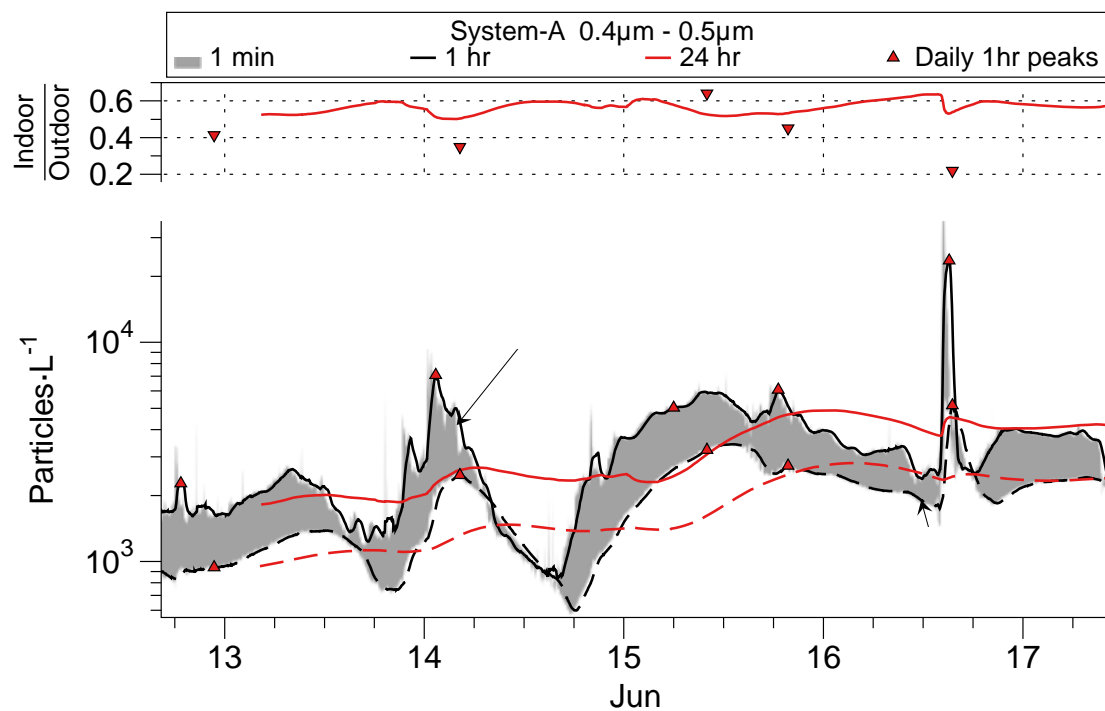


Figure SU-2-A-8. Number concentrations of 0.4–0.5 μm diameter particles measured outdoors and indoors during operation of System A, June 12-17, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-2-A-3.

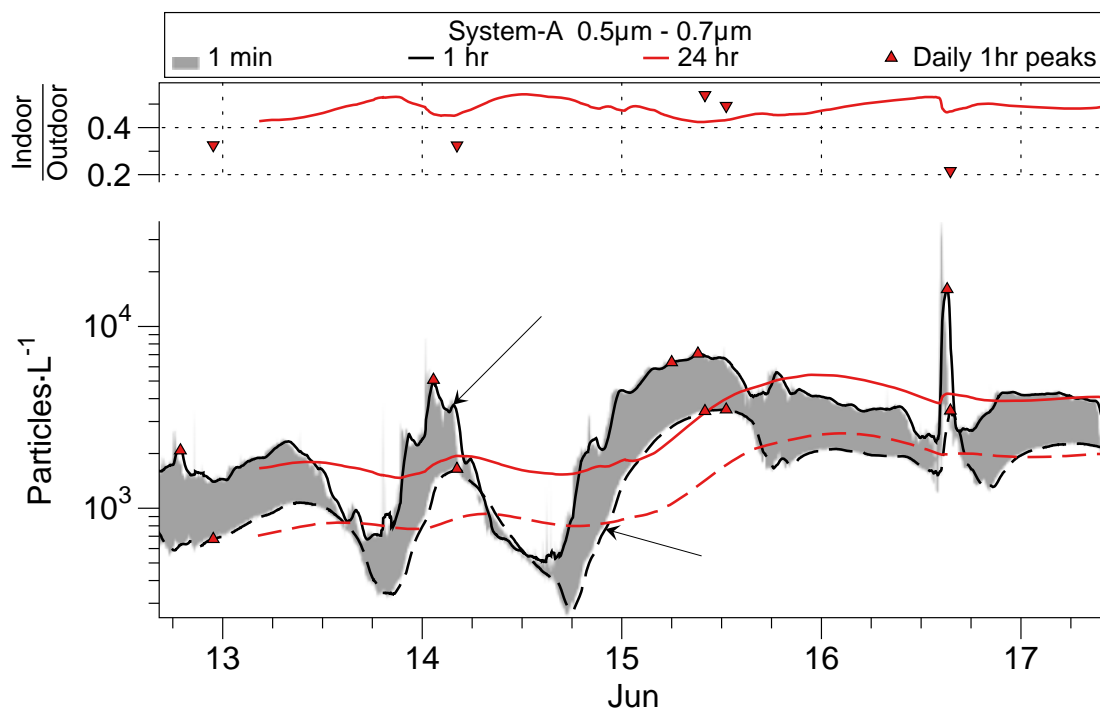


Figure SU-2-A-9. Number concentrations of 0.5–0.7 μm diameter particles measured outdoors and indoors during operation of System A, June 12-17, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-2-A-3.

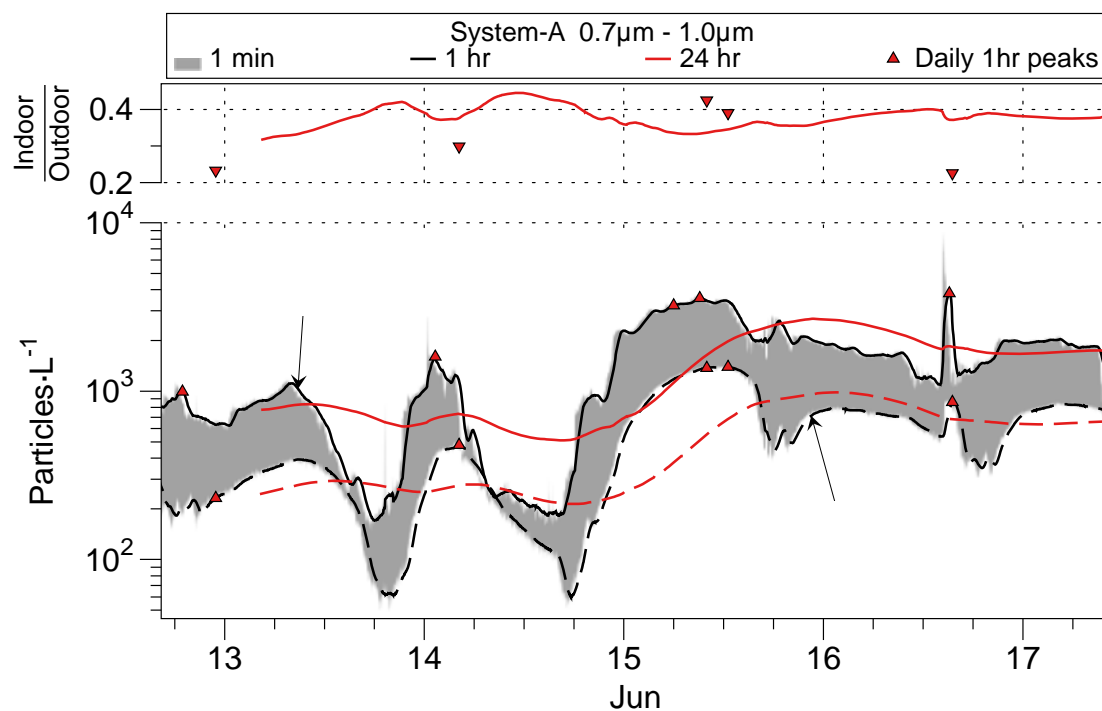


Figure SU-2-A-10. Number concentrations of 0.7–1.0 μm diameter particles measured outdoors and indoors during operation of System A, June 12-17, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-2-A-3.

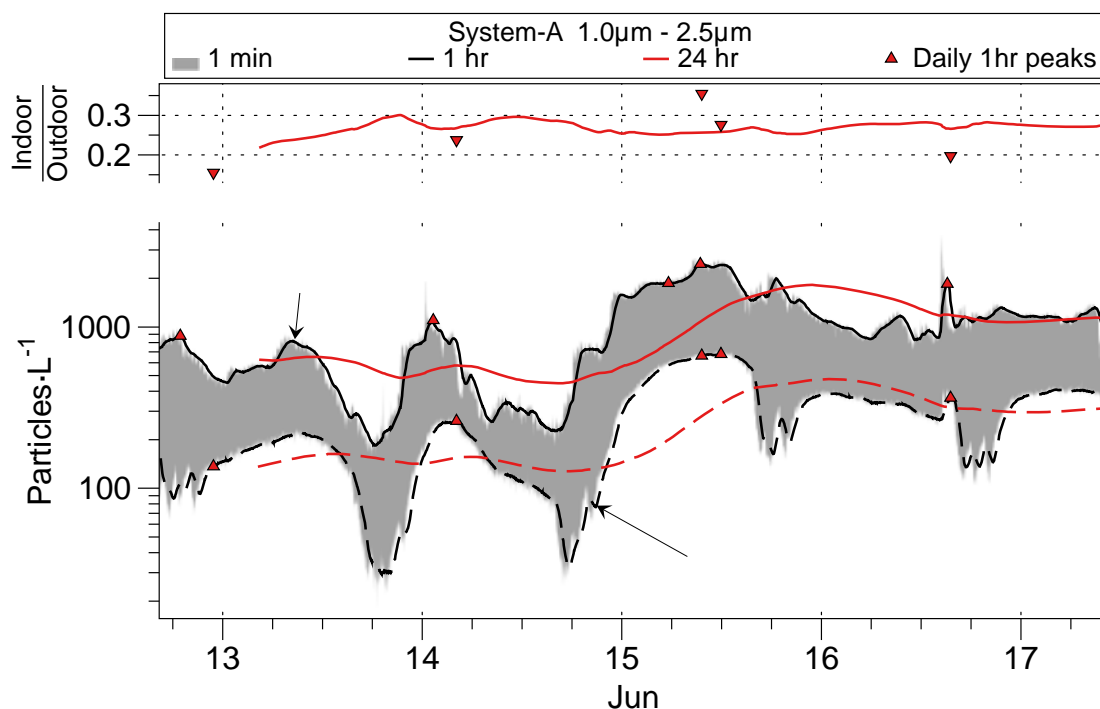


Figure SU-2-A-11. Number concentrations of 1.0–2.5 μm diameter particles measured outdoors and indoors during operation of System A, June 12-17, 2014. Data collected using MetOne BT637S particle counters. Refer to Figure SU-2-A-3 for details.

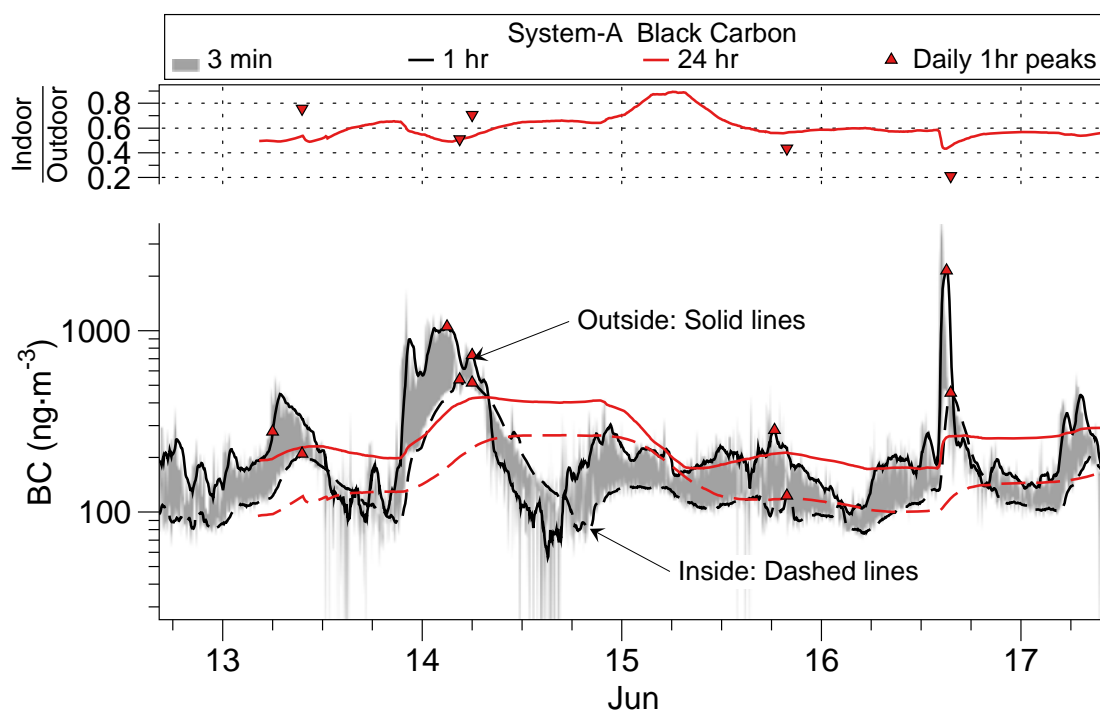


Figure SU-2-A-12. Black carbon concentrations measured outdoors and indoors during operation of System A, June 12-17, 2014. Data collected using AE22 Aethalometers with 3-min samples. Data otherwise as described in Figure SU-2-A-3 caption.

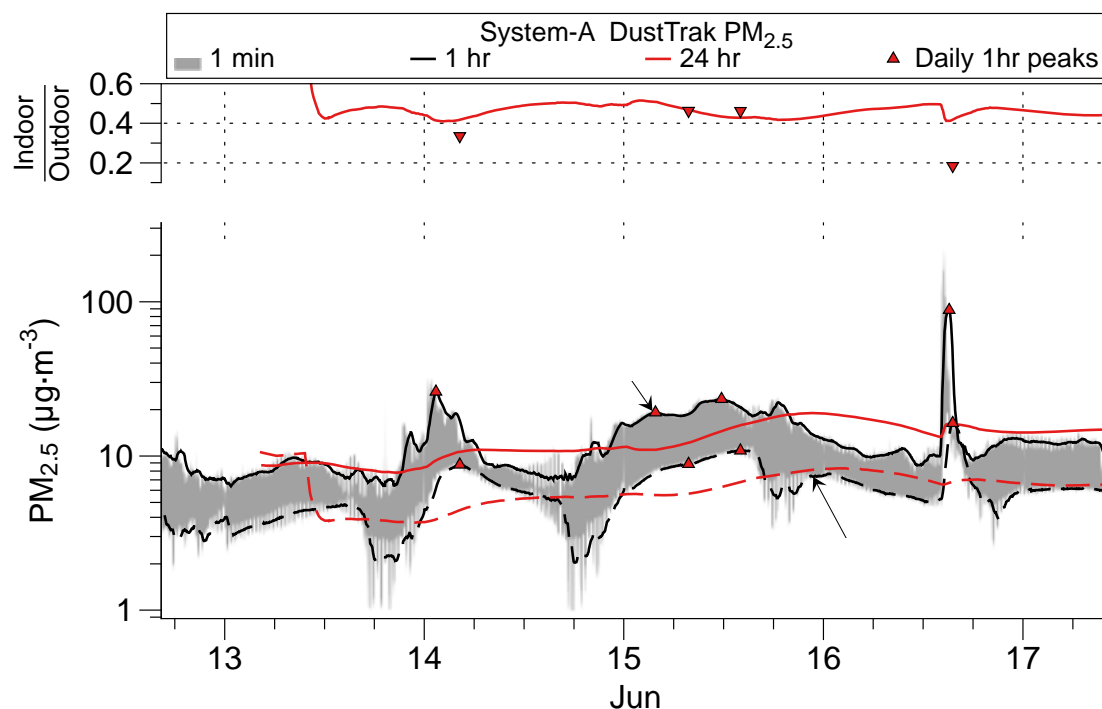


Figure SU-2-A-13. PM_{2.5} reported by TSI DustTrak II 8530 measurements outdoors and indoors during operation of System A, June 12-17, 2014. The DustTrak measures light scattering and uses a calibration to estimate PM_{2.5} mass. Refer to “Guide” before Figure SU-2-A-3.

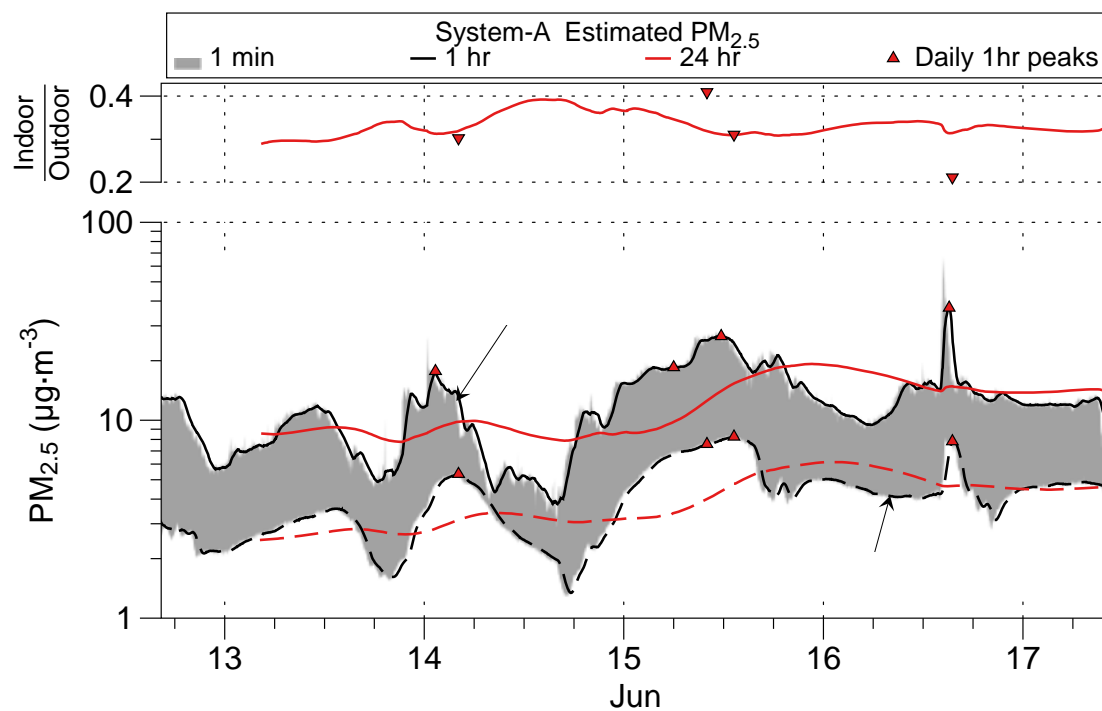


Figure SU-2-A-14. Estimated PM_{2.5} concentration calculated from size-resolved particle number concentrations measured by MetOne and CPC during operation of System A, June 12-17, 2014. Details provided in body of report. Refer to “Guide” before Figure SU-2-A-3.

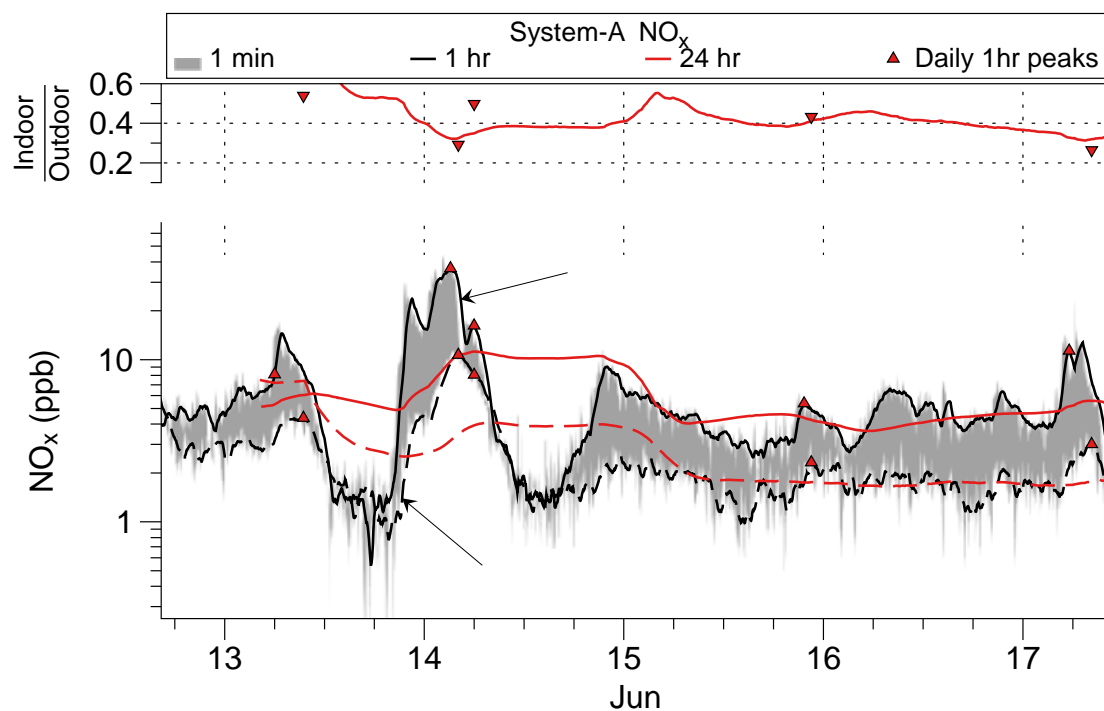


Figure SU-2-A-15. Nitrogen oxides concentrations measured outdoors and indoors during operation of System A, June 12-17, 2014. Data collected using API 200A and 200E chemiluminescence analyzers.

Table SU-2-A-2. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 6 nm to 2.5 micron measured using the TSI 3787 CPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Mean ¹	SD ¹
Outdoor 24h mean	1.3E+4	1.4E+4	8.6E+3	1.4E+4	1.8E+4	1.3E+4	3.0E+3
Outdoor 24 SD	6.3E+3	6.0E+3	2.5E+3	8.6E+3	1.3E+4	7.4E+3	3.6E+3
Indoor 24h mean	2.4E+3	2.9E+3	2.0E+3	2.3E+3	2.6E+3	2.5E+3	3.2E+2
Indoor 24 SD	1.1E+3	7.9E+2	2.7E+2	9.5E+2	1.6E+3	9.3E+2	4.2E+2
24h mean In/Out	0.19	0.18	0.24	0.18	0.15	0.19	0.03
Highest 8h Outdoor	2.3E+4	2.1E+4	1.2E+4	2.4E+4	3.5E+4	2.3E+4	7.4E+3
Highest 8h Indoor	4.6E+3	3.6E+3	3.2E+3	3.6E+3	4.6E+3	3.9E+3	5.8E+2
Highest 8 h In/Out	0.19	0.17	0.27	0.15	0.13	0.18	0.05
Highest 1h Outdoor	2.3E+4	2.7E+4	1.3E+4	3.6E+4	4.6E+4	2.9E+4	1.1E+4
Highest 1 h Indoor ²	4.6E+3	3.6E+3	3.2E+3	3.6E+3	4.6E+3	4.2E+3	1.2E+3
Highest 1h In/Out	0.19	0.17	0.18	0.11	0.13	0.16	0.03
Time of highest 1h Outdoor	6/12/14 15:35	6/13/14 11:13	6/14/14 19:08	6/15/14 11:06	6/16/14 12:03		
Corresponding highest 1h Indoor	6/12/14 15:39	6/13/14 13:44	6/14/14 20:10	6/15/14 14:40	6/16/14 15:52		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 6/13/2014 04:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-2-A-3. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 100 nm to 2.5 micron measured using the TSI 3781 CPC with size selector.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Mean ¹	SD ¹
Outdoor 24h mean	4.0E+2	6.8E+2	3.8E+2	4.1E+2	4.3E+2	4.6E+2	1.1E+2
Outdoor 24 SD	2.8E+2	2.4E+2	1.8E+2	2.4E+2	4.9E+2	2.9E+2	1.1E+2
Indoor 24h mean	2.5E+2	2.6E+2	2.0E+2	1.8E+2	1.8E+2	2.1E+2	3.5E+1
Indoor 24 SD	5.5E+2	9.6E+1	6.3E+1	5.9E+1	1.1E+2	1.8E+2	1.9E+2
24h mean In/Out	0.91	0.43	0.47	0.45	0.43	0.54	0.19
Highest 8h Outdoor	7.4E+2	9.6E+2	9.3E+2	7.2E+2	8.6E+2	8.4E+2	9.7E+1
Highest 8h Indoor	2.1E+2	4.0E+2	4.0E+2	2.6E+2	3.0E+2	3.1E+2	7.5E+1
Highest 8 h In/Out	0.28	0.41	0.43	0.36	0.35	0.37	0.05
Highest 1h Outdoor	1.0E+3	1.2E+3	8.6E+2	9.7E+2	2.4E+3	1.3E+3	5.5E+2
Highest 1 h Indoor ²	2.1E+2	4.0E+2	4.0E+2	2.6E+2	3.0E+2	3.7E+2	7.3E+1
Highest 1h In/Out	0.27	0.34	0.49	0.30	0.19	0.32	0.10
Time of highest 1h Outdoor	6/12/14 16:20	6/13/14 22:25	6/14/14 6:00	6/15/14 16:48	6/16/14 15:03		
Corresponding highest 1h Indoor	6/12/14 17:37	6/14/14 2:25	6/14/14 6:00	6/15/14 16:48	6/16/14 15:50		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 6/13/2014 04:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-2-A-4. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 6–100 nm based on difference between concentrations measured using the TSI 3787 CPC and the TSI 3781 CPC with size selector.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Mean ¹	SD ¹
Outdoor 24h mean	1.2E+4	1.4E+4	8.2E+3	1.3E+4	1.7E+4	1.3E+4	2.9E+3
Outdoor 24 SD	6.1E+3	6.1E+3	2.4E+3	8.5E+3	1.3E+4	7.3E+3	3.6E+3
Indoor 24h mean	2.3E+3	2.7E+3	1.8E+3	2.2E+3	2.4E+3	2.3E+3	3.0E+2
Indoor 24 SD	1.0E+3	7.4E+2	2.2E+2	9.0E+2	1.5E+3	8.7E+2	4.1E+2
24h mean In/Out	0.18	0.17	0.23	0.17	0.15	0.18	0.03
Highest 8h Outdoor	2.2E+4	2.0E+4	1.1E+4	2.3E+4	3.4E+4	2.2E+4	7.4E+3
Highest 8h Indoor	4.3E+3	3.3E+3	2.8E+3	3.3E+3	4.3E+3	3.6E+3	6.1E+2
Highest 8 h In/Out	0.19	0.17	0.25	0.14	0.13	0.18	0.04
Highest 1h Outdoor	2.2E+4	2.6E+4	1.2E+4	3.6E+4	4.5E+4	2.8E+4	1.1E+4
Highest 1 h Indoor ²	4.3E+3	3.3E+3	2.8E+3	3.3E+3	4.3E+3	3.8E+3	1.1E+3
Highest 1h In/Out	0.17	0.16	0.16	0.10	0.12	0.14	0.03
Time of highest 1h Outdoor	6/12/14 19:24	6/13/14 11:13	6/14/14 10:17	6/15/14 11:06	6/16/14 12:03		
Corresponding highest 1h Indoor	6/12/14 19:56	6/13/14 13:42	6/14/14 13:36	6/15/14 14:34	6/16/14 15:52		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 6/13/2014 04:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-2-A-5. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 100–300 nm based on difference between concentrations measured using the TSI 3781 CPC with size selector and the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Mean ¹	SD ¹
Outdoor 24h mean	3.5E+5	6.5E+5	3.5E+5	3.7E+5	4.0E+5	4.2E+5	1.2E+5
Outdoor 24 SD	2.6E+5	2.3E+5	1.7E+5	2.3E+5	4.7E+5	2.7E+5	1.0E+5
Indoor 24h mean	1.5E+5	2.5E+5	1.9E+5	1.6E+5	1.6E+5	1.8E+5	3.8E+4
Indoor 24 SD	6.3E+4	9.2E+4	6.2E+4	5.7E+4	1.0E+5	7.6E+4	1.9E+4
24h mean In/Out	0.38	0.39	0.47	0.44	0.41	0.42	0.03
Highest 8h Outdoor	1.0E+6	9.2E+5	8.9E+5	6.7E+5	8.3E+5	8.7E+5	1.2E+5
Highest 8h Indoor	2.6E+5	3.8E+5	3.8E+5	2.3E+5	2.8E+5	3.1E+5	6.1E+4
Highest 8 h In/Out	0.25	0.41	0.42	0.35	0.34	0.35	0.06
Highest 1h Outdoor	1.0E+6	1.1E+6	8.3E+5	9.3E+5	2.2E+6	1.2E+6	5.1E+5
Highest 1 h Indoor ²	2.6E+5	3.8E+5	3.8E+5	2.3E+5	2.8E+5	3.5E+5	6.7E+4
Highest 1h In/Out	0.25	0.33	0.49	0.29	0.19	0.31	0.10
Time of highest 1h Outdoor	6/12/14 15:54	6/13/14 22:25	6/14/14 6:00	6/15/14 16:48	6/16/14 15:03		
Corresponding highest 1h Indoor	6/12/14 17:37	6/14/14 2:25	6/14/14 6:00	6/15/14 16:48	6/16/14 15:51		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 6/13/2014 04:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-2-A-6. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.3–0.4 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Mean ¹	SD ¹
Outdoor 24h mean	1.2E+4	1.8E+4	1.6E+4	2.3E+4	1.7E+4	1.7E+4	3.4E+3
Outdoor 24 SD	1.8E+3	8.1E+3	3.9E+3	5.3E+3	1.6E+4	7.1E+3	5.1E+3
Indoor 24h mean	7.0E+3	9.8E+3	1.1E+4	1.5E+4	1.2E+4	1.1E+4	2.6E+3
Indoor 24 SD	3.2E+2	3.3E+3	2.4E+3	1.8E+3	4.7E+3	2.5E+3	1.5E+3
24h mean In/Out	0.55	0.58	0.62	0.62	0.69	0.61	0.05
Highest 8h Outdoor	1.4E+4	2.7E+4	2.7E+4	2.8E+4	2.3E+4	2.4E+4	4.9E+3
Highest 8h Indoor	7.0E+3	1.5E+4	1.5E+4	1.7E+4	1.5E+4	1.4E+4	3.5E+3
Highest 8 h In/Out	0.49	0.57	0.58	0.61	0.66	0.58	0.06
Highest 1h Outdoor	1.6E+4	4.2E+4	2.2E+4	3.3E+4	8.6E+4	4.0E+4	2.5E+4
Highest 1 h Indoor ²	7.0E+3	1.5E+4	1.5E+4	1.7E+4	1.5E+4	1.7E+4	6.7E+3
Highest 1h In/Out	0.47	0.40	0.72	0.52	0.33	0.49	0.13
Time of highest 1h Outdoor	6/12/14 18:36	6/14/14 1:25	6/14/14 6:00	6/15/14 18:35	6/16/14 15:08		
Corresponding highest 1h Indoor	6/12/14 19:19	6/14/14 4:27	6/14/14 6:00	6/15/14 20:02	6/16/14 15:30		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 6/13/2014 04:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-2-A-7. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.4–0.5 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Mean ¹	SD ¹
Outdoor 24h mean	1.9E+3	2.7E+3	2.5E+3	4.6E+3	4.2E+3	3.2E+3	1.1E+3
Outdoor 24 SD	2.9E+2	1.5E+3	1.4E+3	9.6E+2	5.1E+3	1.8E+3	1.7E+3
Indoor 24h mean	9.8E+2	1.4E+3	1.4E+3	2.8E+3	2.4E+3	1.8E+3	6.7E+2
Indoor 24 SD	1.1E+2	5.1E+2	5.9E+2	4.0E+2	7.6E+2	4.7E+2	2.2E+2
24h mean In/Out	0.51	0.55	0.58	0.55	0.59	0.56	0.03
Highest 8h Outdoor	1.9E+3	4.2E+3	4.2E+3	5.5E+3	5.7E+3	4.3E+3	1.4E+3
Highest 8h Indoor	1.2E+3	2.1E+3	2.7E+3	3.3E+3	2.8E+3	2.4E+3	7.0E+2
Highest 8 h In/Out	0.64	0.51	0.64	0.60	0.49	0.57	0.06
Highest 1h Outdoor	2.3E+3	7.1E+3	5.0E+3	6.1E+3	2.4E+4	8.8E+3	7.6E+3
Highest 1 h Indoor ²	1.2E+3	2.1E+3	2.7E+3	3.3E+3	2.8E+3	2.9E+3	1.4E+3
Highest 1h In/Out	0.41	0.35	0.64	0.45	0.22	0.41	0.14
Time of highest 1h Outdoor	6/12/14 18:44	6/14/14 1:23	6/15/14 6:00	6/15/14 18:34	6/16/14 15:08		
Corresponding highest 1h Indoor	6/12/14 22:44	6/14/14 4:17	6/15/14 10:00	6/15/14 19:45	6/16/14 15:31		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 6/13/2014 04:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-2-A-8. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.5–0.7 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Mean ¹	SD ¹
Outdoor 24h mean	1.7E+3	1.9E+3	2.4E+3	5.0E+3	4.0E+3	3.0E+3	1.3E+3
Outdoor 24 SD	2.5E+2	1.1E+3	2.0E+3	1.2E+3	3.3E+3	1.6E+3	1.0E+3
Indoor 24h mean	7.3E+2	9.2E+2	1.1E+3	2.5E+3	1.9E+3	1.4E+3	6.8E+2
Indoor 24 SD	1.1E+2	3.9E+2	7.5E+2	6.6E+2	4.6E+2	4.7E+2	2.2E+2
24h mean In/Out	0.41	0.48	0.50	0.46	0.50	0.47	0.03
Highest 8h Outdoor	1.8E+3	3.1E+3	5.1E+3	6.6E+3	4.9E+3	4.3E+3	1.7E+3
Highest 8h Indoor	6.5E+2	1.4E+3	2.8E+3	3.3E+3	1.9E+3	2.0E+3	9.7E+2
Highest 8 h In/Out	0.36	0.45	0.56	0.50	0.40	0.45	0.07
Highest 1h Outdoor	2.1E+3	5.1E+3	6.3E+3	7.1E+3	1.6E+4	7.3E+3	4.7E+3
Highest 1 h Indoor ²	6.5E+2	1.4E+3	2.8E+3	3.3E+3	1.9E+3	2.5E+3	1.2E+3
Highest 1h In/Out	0.33	0.32	0.54	0.49	0.22	0.38	0.12
Time of highest 1h Outdoor	6/12/14 18:56	6/14/14 1:21	6/15/14 6:00	6/15/14 9:09	6/16/14 15:08		
Corresponding highest 1h Indoor	6/12/14 22:53	6/14/14 4:11	6/15/14 10:00	6/15/14 12:33	6/16/14 15:31		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 6/13/2014 04:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-2-A-9. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.7–1.0 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Mean ¹	SD ¹
Outdoor 24h mean	7.9E+2	7.0E+2	1.1E+3	2.4E+3	1.7E+3	1.4E+3	6.4E+2
Outdoor 24 SD	1.2E+2	4.1E+2	1.1E+3	6.8E+2	6.6E+2	5.9E+2	3.2E+2
Indoor 24h mean	2.6E+2	2.8E+2	3.8E+2	9.4E+2	6.5E+2	5.0E+2	2.6E+2
Indoor 24 SD	5.6E+1	1.4E+2	3.5E+2	3.3E+2	1.6E+2	2.0E+2	1.1E+2
24h mean In/Out	0.29	0.38	0.40	0.36	0.39	0.36	0.04
Highest 8h Outdoor	8.9E+2	1.0E+3	2.6E+3	3.4E+3	2.0E+3	2.0E+3	9.3E+2
Highest 8h Indoor	2.2E+2	3.9E+2	1.2E+3	1.3E+3	8.1E+2	7.9E+2	4.3E+2
Highest 8 h In/Out	0.24	0.37	0.46	0.40	0.41	0.38	0.07
Highest 1h Outdoor	9.9E+2	1.6E+3	3.2E+3	3.6E+3	3.8E+3	2.6E+3	1.1E+3
Highest 1 h Indoor ²	2.2E+2	3.9E+2	1.2E+3	1.3E+3	8.1E+2	8.7E+2	4.7E+2
Highest 1h In/Out	0.23	0.30	0.42	0.39	0.23	0.31	0.08
Time of highest 1h Outdoor	6/12/14 18:55	6/14/14 1:20	6/15/14 6:00	6/15/14 9:08	6/16/14 15:09		
Corresponding highest 1h Indoor	6/12/14 22:55	6/14/14 4:12	6/15/14 9:58	6/15/14 12:32	6/16/14 15:31		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 6/13/2014 04:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-2-A-10. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 1.0–2.5 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Mean ¹	SD ¹
Outdoor 24h mean	6.2E+2	5.7E+2	8.2E+2	1.6E+3	1.1E+3	9.4E+2	3.8E+2
Outdoor 24 SD	1.3E+2	2.7E+2	6.3E+2	5.3E+2	2.4E+2	3.6E+2	1.9E+2
Indoor 24h mean	1.4E+2	1.6E+2	2.1E+2	4.5E+2	3.0E+2	2.5E+2	1.1E+2
Indoor 24 SD	3.8E+1	7.8E+1	1.7E+2	1.7E+2	8.6E+1	1.1E+2	5.4E+1
24h mean In/Out	0.19	0.27	0.27	0.26	0.28	0.25	0.03
Highest 8h Outdoor	8.2E+2	7.9E+2	1.7E+3	2.2E+3	1.2E+3	1.3E+3	5.4E+2
Highest 8h Indoor	1.2E+2	2.2E+2	5.9E+2	6.5E+2	2.8E+2	3.7E+2	2.1E+2
Highest 8 h In/Out	0.14	0.28	0.35	0.29	0.23	0.26	0.07
Highest 1h Outdoor	8.8E+2	1.1E+3	1.9E+3	2.5E+3	1.8E+3	1.6E+3	5.7E+2
Highest 1 h Indoor ²	1.2E+2	2.2E+2	5.9E+2	6.5E+2	2.8E+2	4.2E+2	2.2E+2
Highest 1h In/Out	0.16	0.24	0.35	0.28	0.20	0.24	0.07
Time of highest 1h Outdoor	6/12/14 18:54	6/14/14 1:20	6/15/14 5:37	6/15/14 9:27	6/16/14 15:09		
Corresponding highest 1h Indoor	6/12/14 22:54	6/14/14 4:07	6/15/14 9:37	6/15/14 11:55	6/16/14 15:32		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 6/13/2014 04:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-2-A-11. Summary statistics for estimated PM_{2.5} concentrations (µg m⁻³) calculated from particle number concentrations resolved by size from 6 nm to 2.5 microns (as reported in Tables SU-2-A-2 to SU-2-A-9) and resulting indoor/outdoor ratios.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Mean ¹	SD ¹
Outdoor 24h mean	8.5E+0	9.9E+0	9.8E+0	1.7E+1	1.4E+1	1.2E+1	3.3E+0
Outdoor 24 SD	2.6E+0	3.3E+0	5.3E+0	5.6E+0	5.6E+0	4.5E+0	1.3E+0
Indoor 24h mean	2.5E+0	3.3E+0	3.4E+0	5.9E+0	4.5E+0	3.9E+0	1.2E+0
Indoor 24 SD	2.8E-1	1.1E+0	1.6E+0	1.5E+0	9.4E-1	1.1E+0	4.7E-1
24h mean In/Out	0.26	0.31	0.37	0.32	0.33	0.32	0.04
Highest 8h Outdoor	1.3E+1	1.3E+1	1.7E+1	2.3E+1	1.8E+1	1.7E+1	3.8E+0
Highest 8h Indoor	3.3E+0	4.7E+0	6.7E+0	7.8E+0	5.0E+0	5.5E+0	1.6E+0
Highest 8 h In/Out	0.25	0.36	0.41	0.33	0.28	0.32	0.06
Highest 1h Outdoor	1.3E+1	1.8E+1	1.8E+1	2.7E+1	3.7E+1	2.3E+1	8.4E+0
Highest 1 h Indoor ²	3.3E+0	4.7E+0	6.7E+0	7.8E+0	5.0E+0	6.5E+0	1.9E+0
Highest 1h In/Out	0.25	0.30	0.41	0.31	0.21	0.30	0.07
Time of highest 1h Outdoor	6/12/14 15:54	6/14/14 1:21	6/15/14 6:00	6/15/14 11:42	6/16/14 15:08		
Corresponding highest 1h Indoor	6/12/14 15:55	6/14/14 4:07	6/15/14 10:00	6/15/14 13:15	6/16/14 15:31		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 6/13/2014 04:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-2-A-12. Summary statistics for concentrations of PM_{2.5} (µg m⁻³) and indoor /outdoor ratios from measurements reported by TSI DustTrak II.

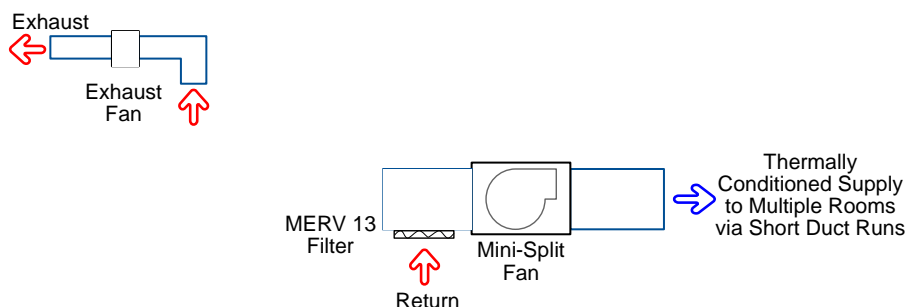
Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Mean ¹	SD ¹
Outdoor 24h mean	8.7E-3	1.1E-2	1.2E-2	1.7E-2	1.5E-2	1.3E-2	2.9E-3
Outdoor 24 SD	2.1E-3	5.0E-3	4.5E-3	4.5E-3	1.9E-2	7.1E-3	6.1E-3
Indoor 24h mean	1.0E-2	4.8E-3	5.6E-3	8.1E-3	6.5E-3	7.0E-3	1.9E-3
Indoor 24 SD	3.1E-2	2.0E-3	1.9E-3	1.9E-3	2.8E-3	8.0E-3	1.2E-2
24h mean In/Out	1.73	0.57	0.49	0.44	0.47	0.74	0.50
Highest 8h Outdoor	1.1E-2	1.6E-2	1.7E-2	2.1E-2	2.1E-2	1.7E-2	3.8E-3
Highest 8h Indoor	6.9E-3	7.7E-3	8.6E-3	1.0E-2	7.9E-3	8.3E-3	1.1E-3
Highest 8 h In/Out	0.62	0.47	0.50	0.48	0.37	0.49	0.08
Highest 1h Outdoor	1.3E-2	2.6E-2	1.9E-2	2.3E-2	8.8E-2	3.4E-2	2.8E-2
Highest 1 h Indoor ²	6.9E-3	7.7E-3	8.6E-3	1.0E-2	7.9E-3	1.0E-2	3.7E-3
Highest 1h In/Out	0.39	0.34	0.46	0.46	0.18	0.37	0.10
Time of highest 1h Outdoor	6/12/14 13:43	6/14/14 1:24	6/15/14 3:48	6/15/14 11:45	6/16/14 15:08		
Corresponding highest 1h Indoor	6/12/14 15:53	6/14/14 4:16	6/15/14 7:47	6/15/14 14:02	6/16/14 15:33		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 6/13/2014 04:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-2-A-13. Daily¹ summary statistics for concentrations (nanograms m⁻³) and indoor /outdoor ratios of aerosol black carbon measured using the Aethalometer AE22.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Mean ¹	SD ¹
Outdoor 24h mean	2.0E+2	4.2E+2	2.0E+2	1.7E+2	2.7E+2	2.5E+2	9.1E+1
Outdoor 24 SD	5.4E+1	3.3E+2	1.2E+2	5.9E+1	4.7E+2	2.1E+2	1.7E+2
Indoor 24h mean	9.7E+1	2.3E+2	1.8E+2	1.0E+2	1.5E+2	1.5E+2	4.8E+1
Indoor 24 SD	1.1E+2	1.4E+2	1.1E+2	1.7E+1	9.0E+1	9.3E+1	4.1E+1
24h mean In/Out	0.42	0.55	0.68	0.64	0.55	0.57	0.09
Highest 8h Outdoor	2.3E+2	8.2E+2	8.2E+2	2.2E+2	4.6E+2	5.1E+2	2.7E+2
Highest 8h Indoor	9.4E+1	4.5E+2	4.5E+2	1.3E+2	2.3E+2	2.7E+2	1.5E+2
Highest 8 h In/Out	0.41	0.55	0.55	0.62	0.50	0.53	0.07
Highest 1h Outdoor	2.8E+2	1.1E+3	7.3E+2	2.8E+2	2.1E+3	9.0E+2	6.9E+2
Highest 1 h Indoor ²	9.4E+1	4.5E+2	4.5E+2	1.3E+2	2.3E+2	3.7E+2	1.7E+2
Highest 1h In/Out	0.76	0.51	0.71	0.43	0.21	0.52	0.20
Time of highest 1h Outdoor	6/13/14 6:00	6/14/14 3:00	6/14/14 6:00	6/15/14 18:21	6/16/14 15:03		
Corresponding highest 1h Indoor	6/13/14 9:33	6/14/14 4:30	6/14/14 6:00	6/15/14 19:51	6/16/14 15:33		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 6/13/2014 04:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Appendix SU-3-F. Results for System F, June 18-22, 2014.**Table SU-3-F-1.** Description of **System F** component characteristics during the period of **June 18-22, 2014**.

System Parameter	Description or Measured Value
Heating	20,000 BTU/h, Heat Pump HSPF 10.6
Cooling	1.5 ton, SEER17.5 air conditioner, variable capacity
Thermal distribution	Central fan with ECM motor: 500-600 cfm
Ventilation	Exhaust fan in main bathroom with ECM; Set to 38 cfm continuous
Filtration	MERV13, 1" (FiltersFast FFM1361) filter installed at the Mini-Split return air plenum. Some particle removal as air infiltrates through building envelope to replace air exiting home through continuous exhaust fan in bathroom.
Recirculation blower schedule	Always on, on the lower speed when no call for conditioning.
VOC removal system	None

Notes about this monitoring period

We lost a CPC 3787 at the beginning of the operational period. This instrument was repaired in the house on 6/19/2015. The CPC 3787 indoor / outdoor data stream was constructed using both instruments when the data was available, and a single instrument when not. We lost a CPC 3781 midway through the operational period, the instrument was brought back to Berkeley on 6/19/2015. The CPC 3781 indoor / outdoor data stream was constructed using both instruments until the problem occurred and the remaining instrument afterward. The majority of the operational period had the indoor DustTrak numbers at the instrument's LDL.

The 24 h running statistics in the figures starts at 6/18/2014 20:30. Data from 6/19/2014 14:00 to 6/20/2014 16:30 was censored from the largest Met1 channel due to indoor activity associated with CPC maintenance and HVAC controller replacement.

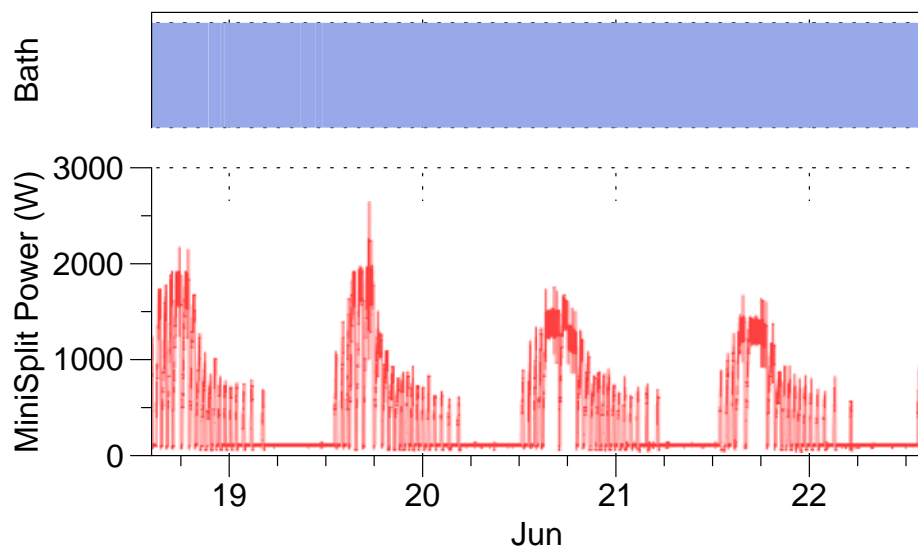


Figure SU-3-F-1. Operation of mechanical systems: Bath exhaust fan; power draw on the Mini-split heat pump.

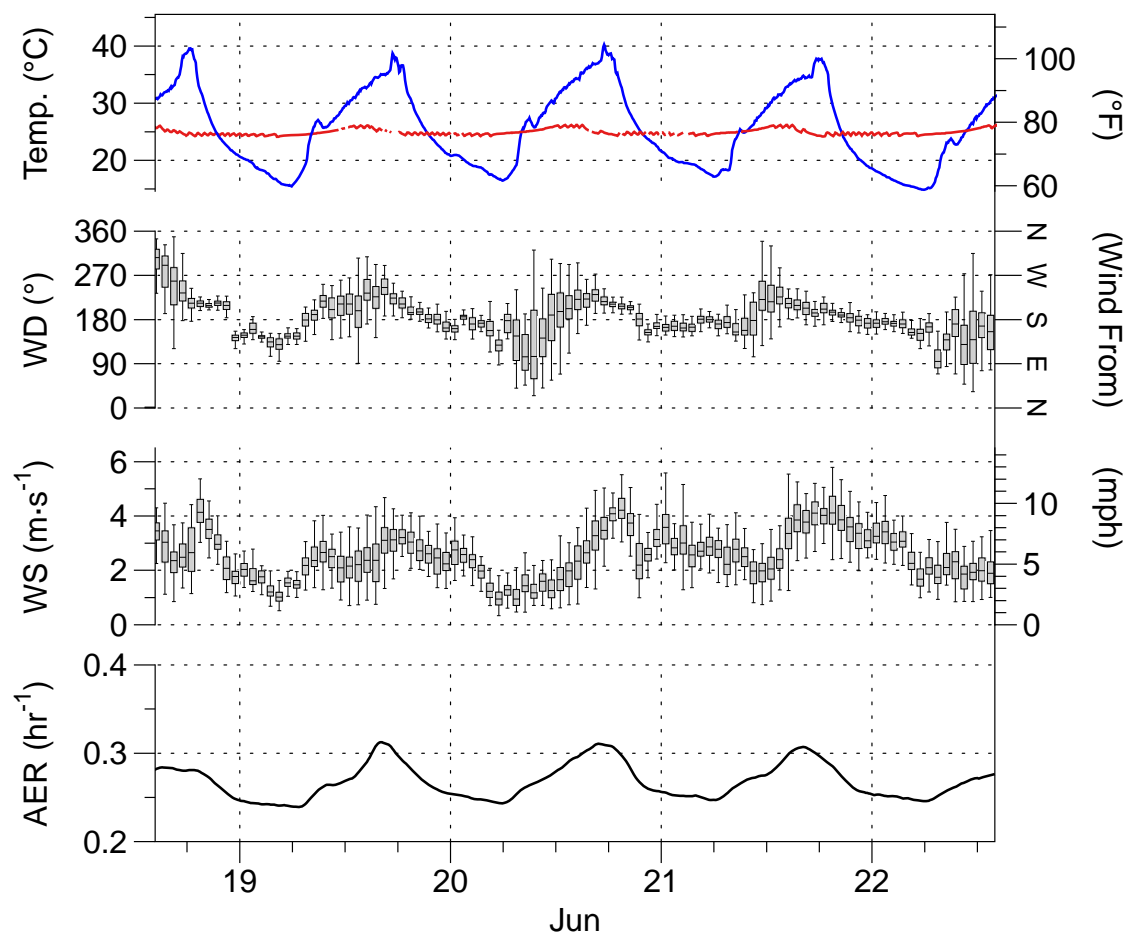


Figure SU-3-F-2. Environmental parameters measured during operation of System F, June 18-22, 2014. From top to bottom: indoor (red) and outdoor (blue) temperatures, wind direction (WD) in units of degrees from North, wind speed (WS), and air exchange rate (AER). For WD and WS, the box for each hour shows the 25th, 50th and 75th percentiles of the measured values and whiskers extend 1.5X the interquartile range (75th–25th percentile values) above the 75th and below the 25th percentile values.

Guide to plots of pollutant concentration time series and indoor / outdoor (I/O) ratios

The bottom section of each plot shows outdoor and indoor time series using the resolution of data collection: 3-min for black carbon and 1-min for all other parameters. The top and bottom of grey band are LOESS-smoothed, 1-min (or 3-min for black carbon) time-series. Also shown are time series with 1h and 24h time averaging for most pollutants and 1h and 8h average for ozone. Triangles in bottom of plot indicate the highest 1h outdoor and corresponding highest 1h indoor average during each day. The top section of each plot shows the ratio of indoor to outdoor running 24h mean values (8h for ozone) and the ratios of highest 1h indoor to corresponding highest 1h outdoor concentration each day.

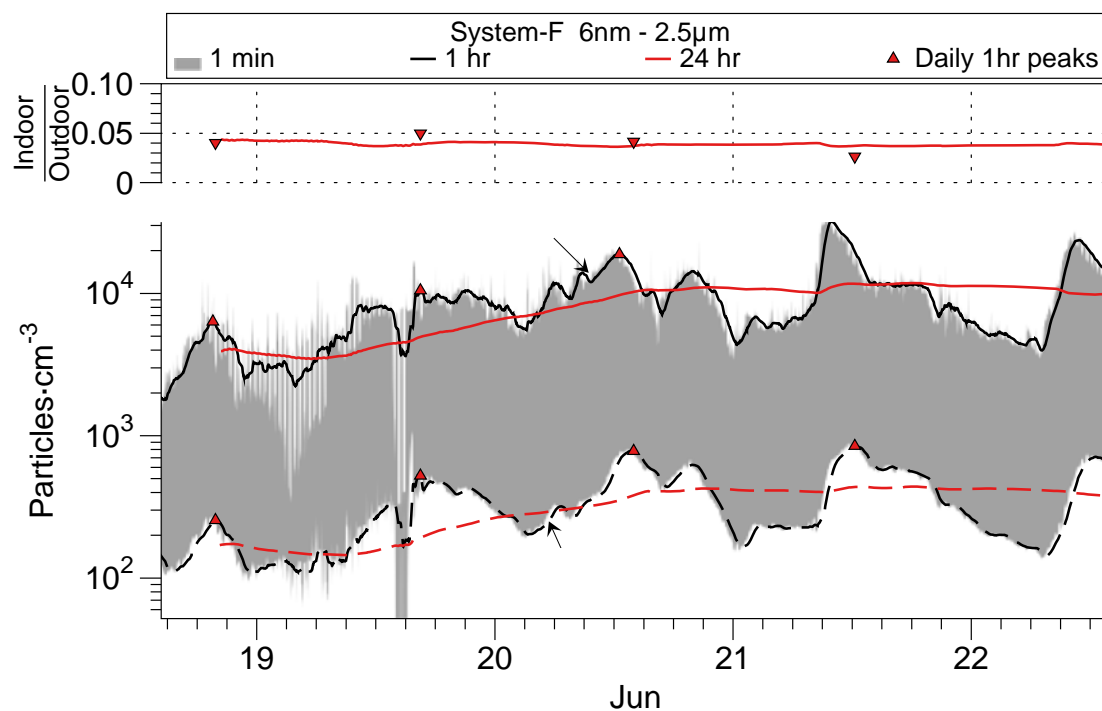


Figure SU-3-F-3. Number concentrations of 6 nm to 2.5 μm diameter particles measured outdoors and indoors during operation of System F, June 18-22, 2014. Data collected using TSI 3787 CPCs. Refer to “Guide” before Figure SU-3-F-3.

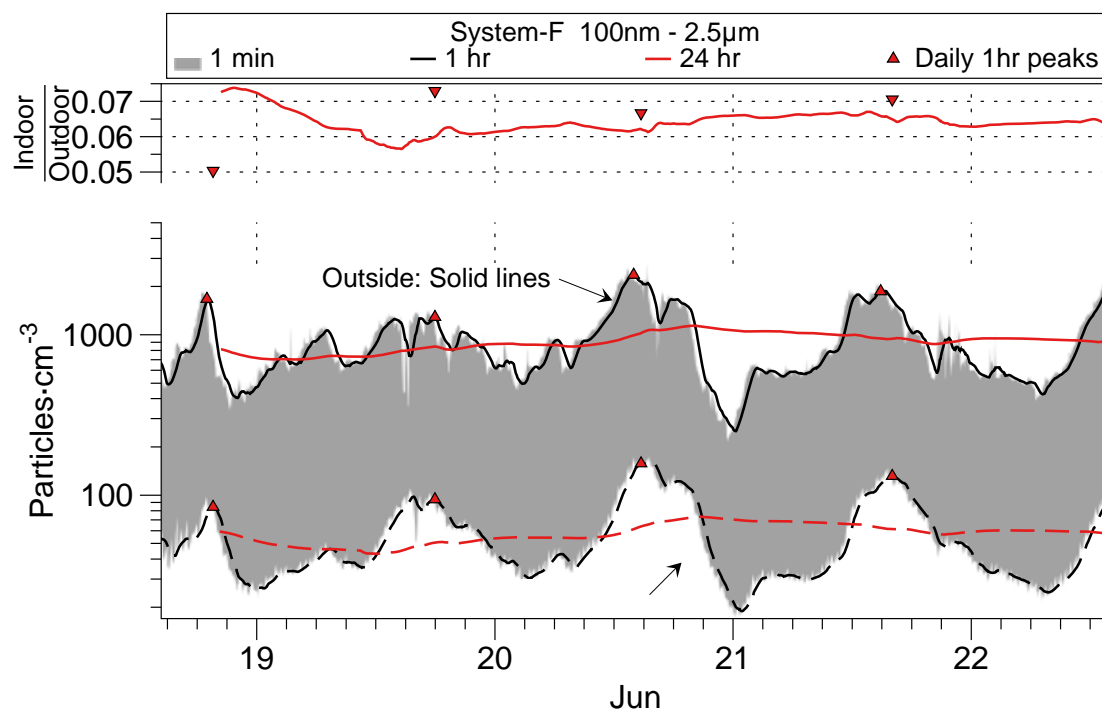


Figure SU-3-F-4. Number concentrations of 100 nm to 2.5 μm diameter particles measured outdoors and indoors during operation of System F, June 18-22, 2014. Data collected using TSI 3781 CPCs outfitted with screens to exclude particles smaller than 100 nm. Refer to “Guide” before Figure SU-3-F-3.

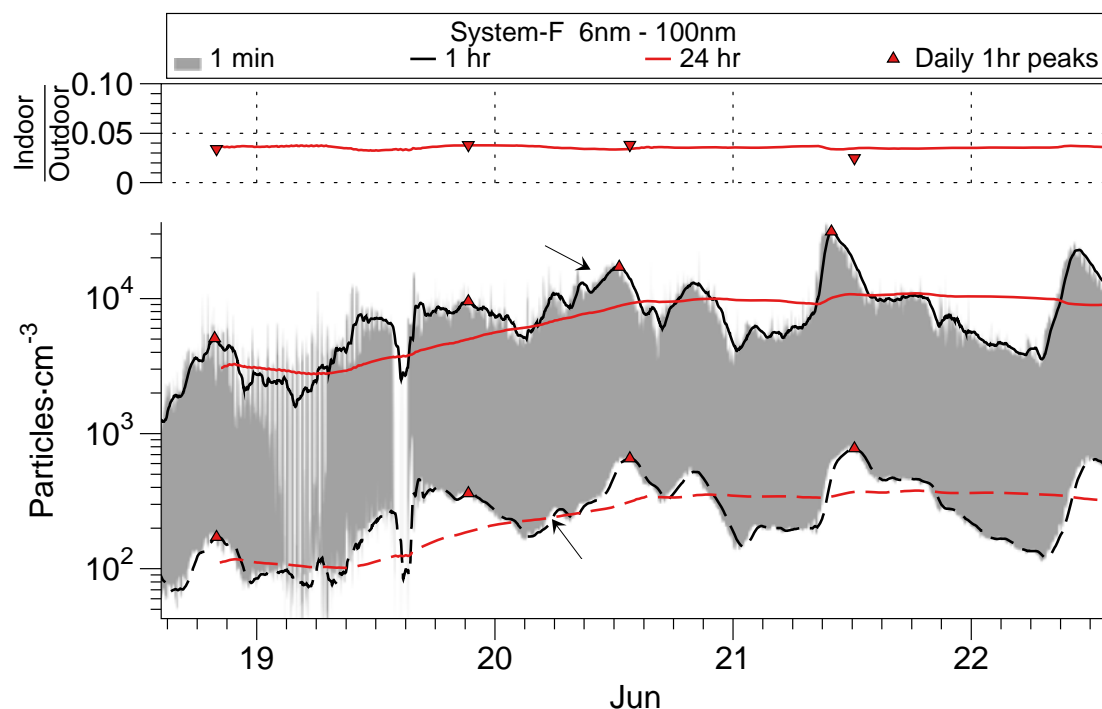


Figure SU-3-F-5. Number concentrations of 6–100 nm diameter particles measured outdoors and indoors during operation of System F, June 18-22, 2014. Data obtained as the difference between time series show in prior two figures. Refer to “Guide” before Figure SU-3-F-3.

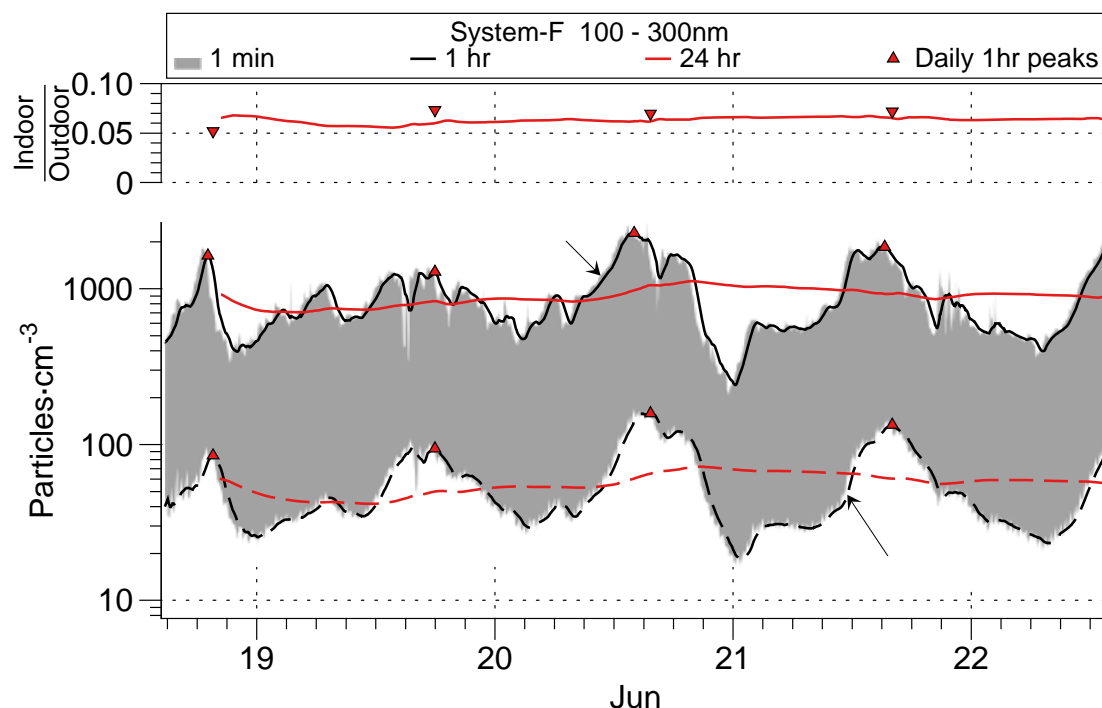


Figure SU-3-F-6. Number concentrations of 100–300 nm diameter particles measured outdoors and indoors during operation of System F, June 18-22, 2014. Data obtained as the difference between the TSI 3781 CPC with size selector and the MetOne BT637S OPC. Refer to “Guide” before Figure SU-3-F-3.

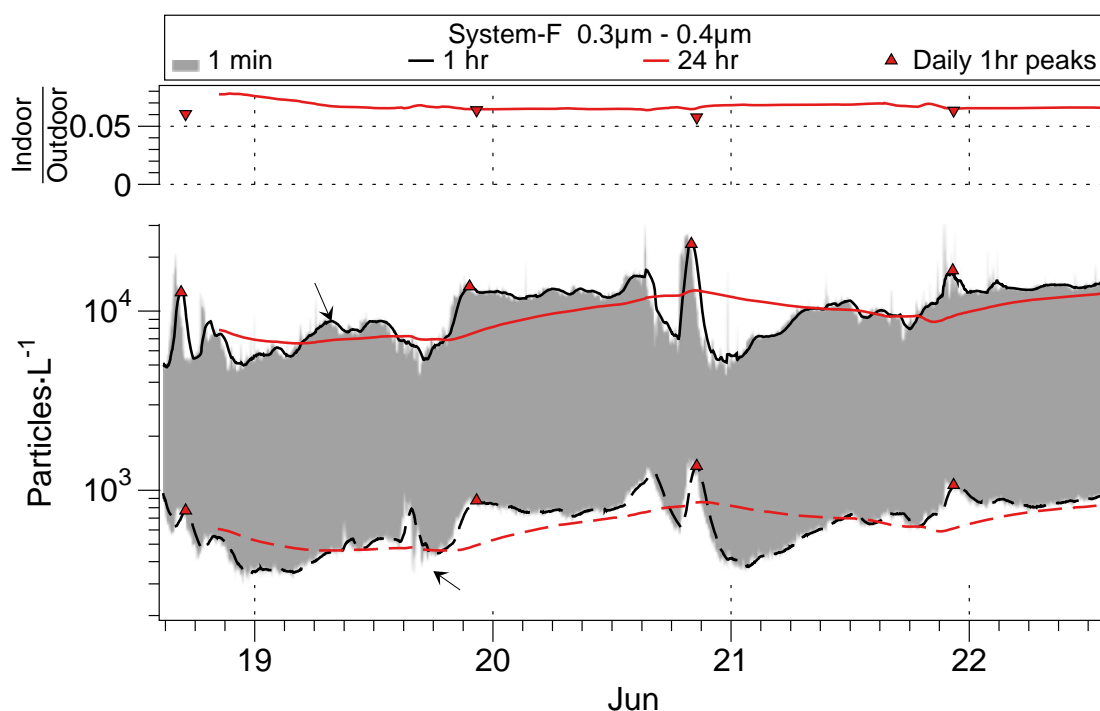


Figure SU-3-F-7. Number concentrations of 0.3–0.4 μm diameter particles measured outdoors and indoors during operation of System F, June 18-22, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-3-F-3.

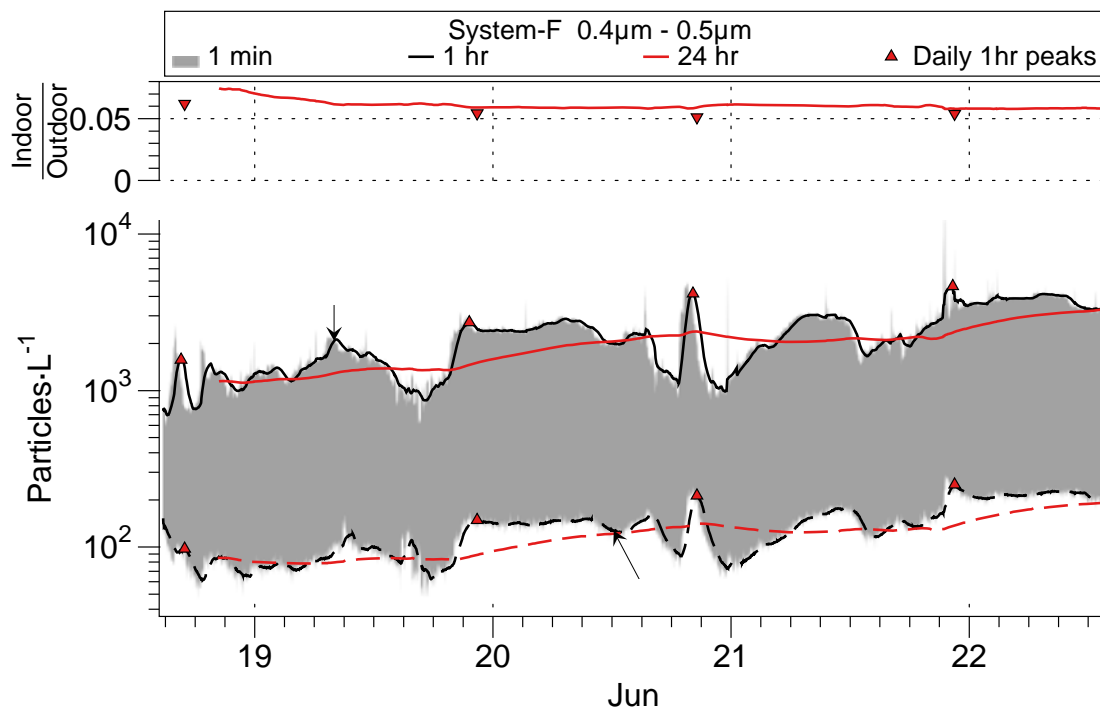


Figure SU-3-F-8. Number concentrations of 0.4–0.5 μm diameter particles measured outdoors and indoors during operation of System F, June 18-22, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-3-F-3.

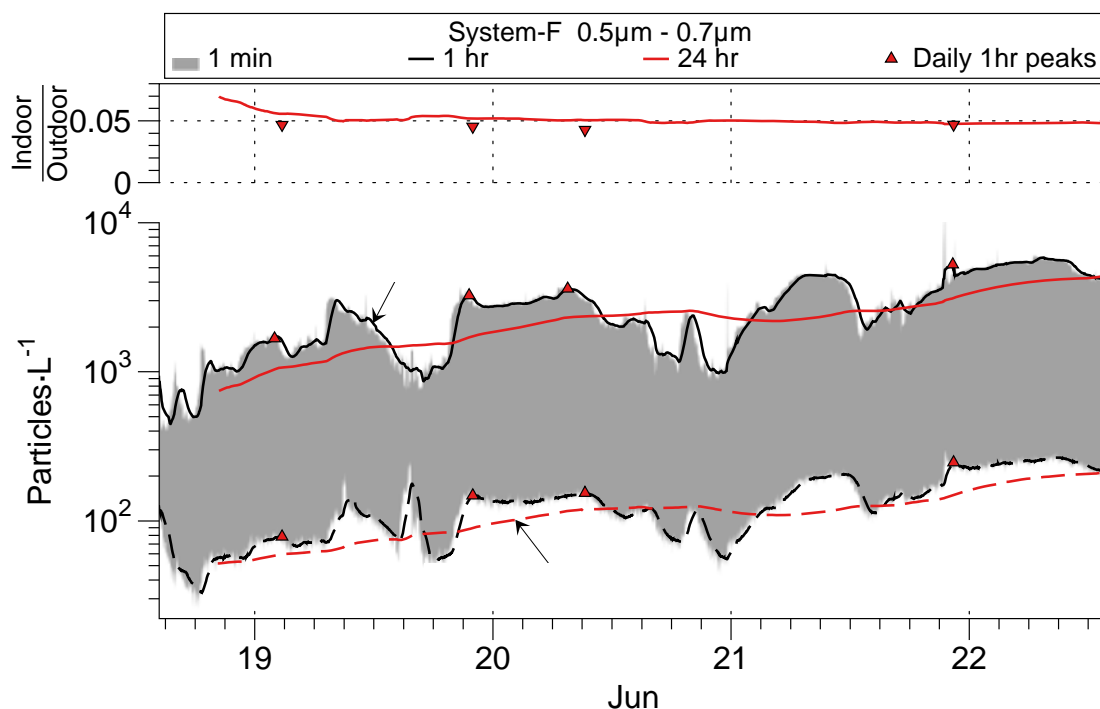


Figure SU-3-F-9. Number concentrations of 0.5–0.7 μm diameter particles measured outdoors and indoors during operation of System F, June 18-22, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-3-F-3.

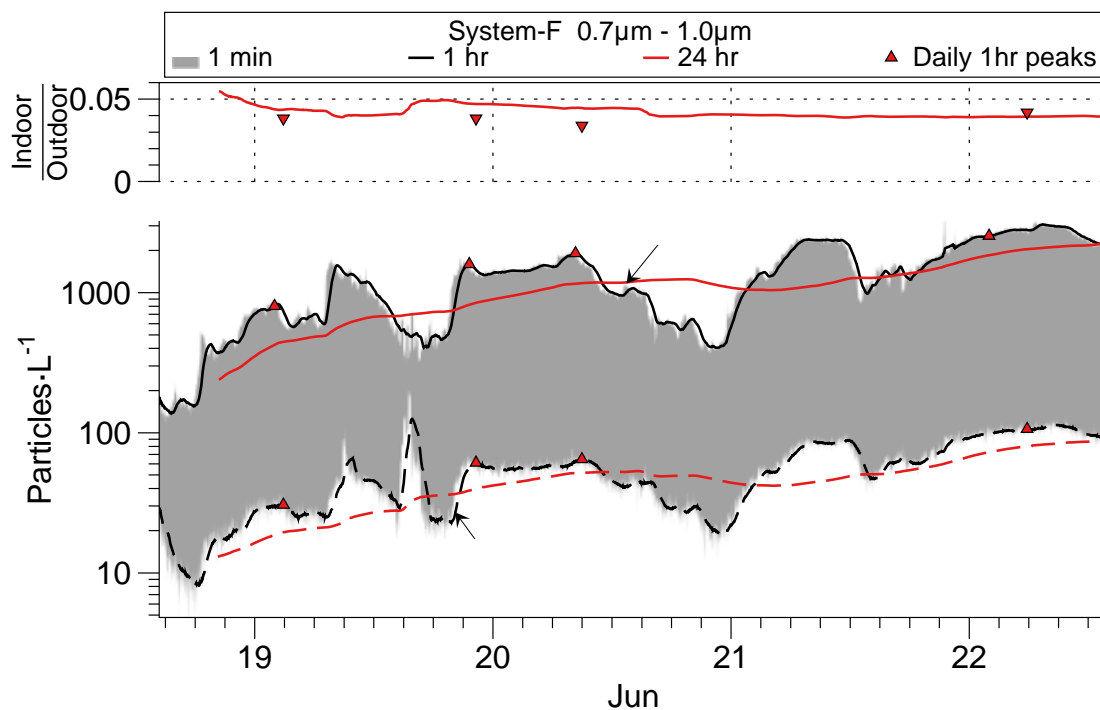


Figure SU-3-F-10. Number concentrations of 0.7–1.0 μm diameter particles measured outdoors and indoors during operation of System F, June 18-22, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-3-F-3.

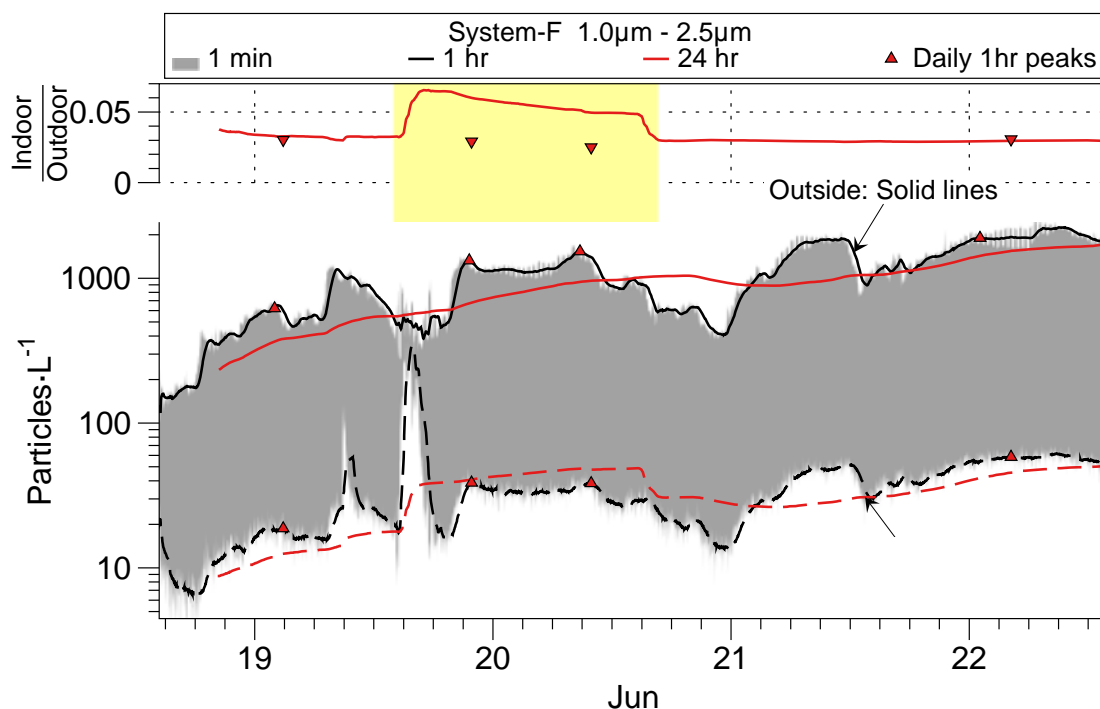


Figure SU-3-F-11. Number concentrations of 1.0–2.5 μm diameter particles measured outdoors and indoors during operation of System F, June 18-22, 2014. Data collected using MetOne BT637S particle counters. Refer to Figure SU-3-F-3 for details. The yellow band indicates censored data due to in house activity.

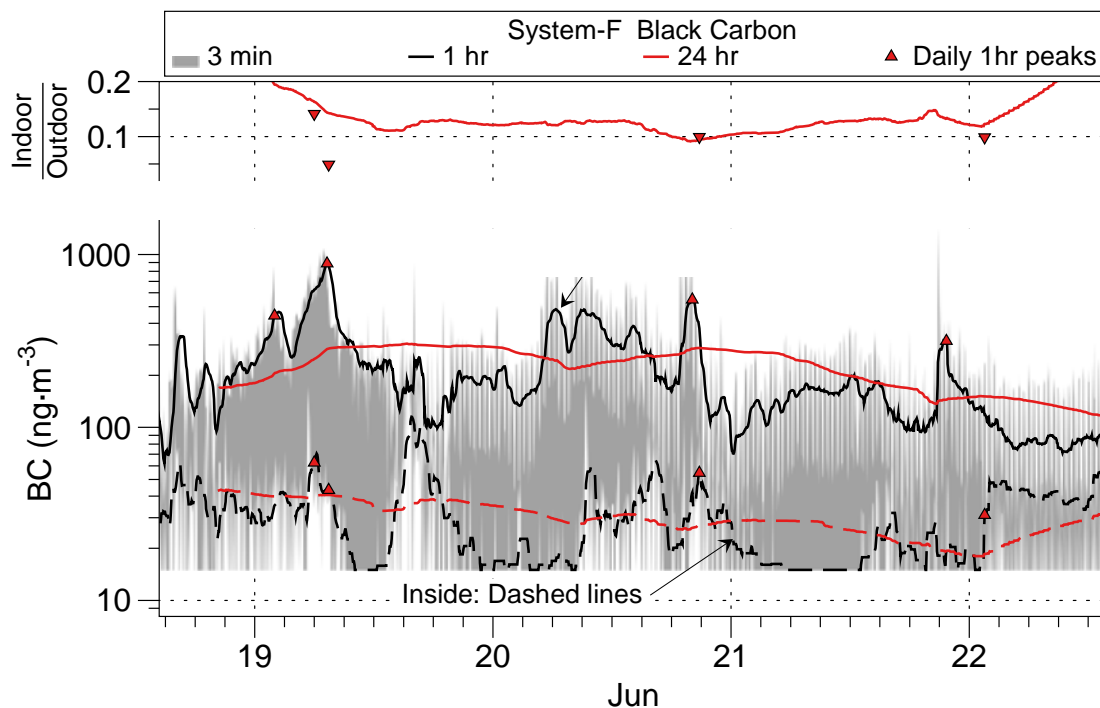


Figure SU-3-F-12. Black carbon concentrations measured outdoors and indoors during operation of System F, June 18-22, 2014. Data collected using AE22 Aethalometers with 3-min samples. Data otherwise as described in Figure SU-3-F-3 caption.

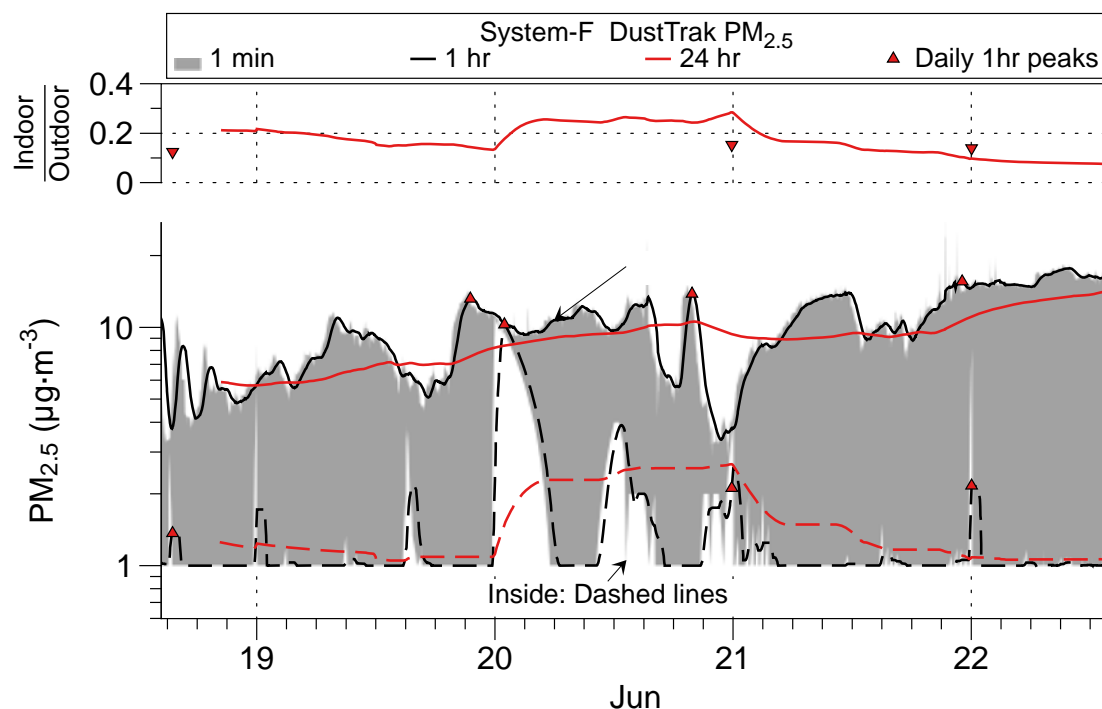


Figure SU-3-F-13. PM_{2.5} reported by TSI DustTrak II 8530 measurements outdoors and indoors during operation of System F, June 18-22, 2014. The DustTrak measures light scattering and uses a calibration to estimate PM_{2.5} mass. Refer to “Guide” before Figure SU-3-F-3.

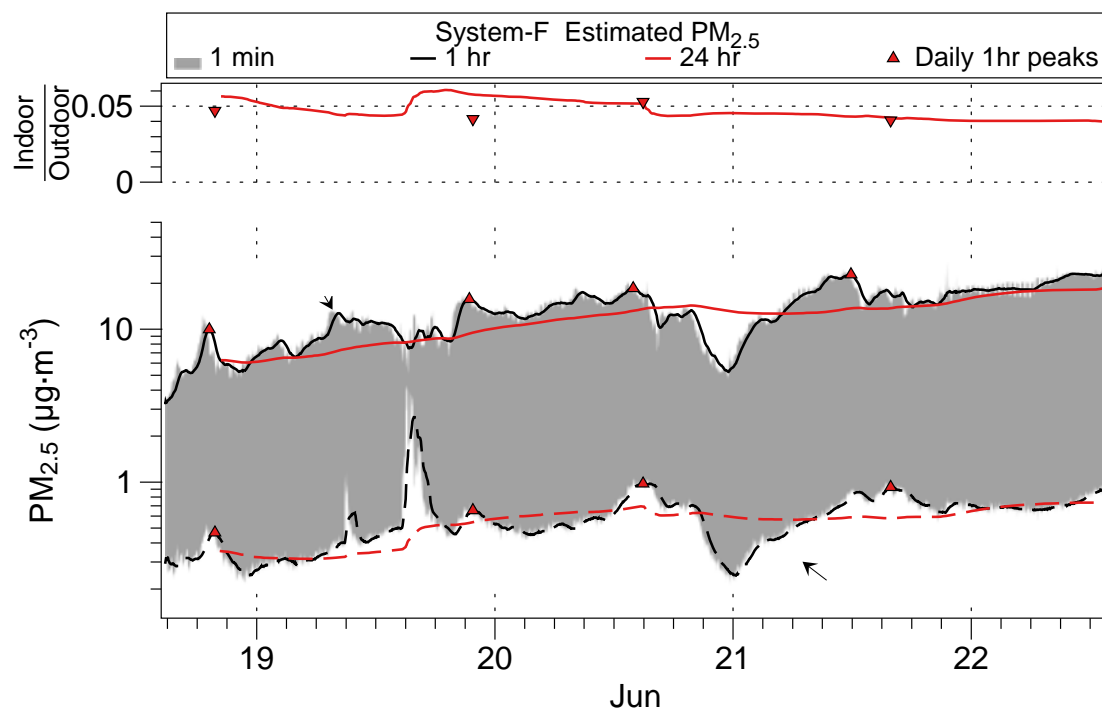


Figure SU-3-F-14. Estimated PM_{2.5} concentration calculated from size-resolved particle number concentrations measured by MetOne and CPC during operation of System F, June 18-22, 2014. Details provided in body of report. Refer to “Guide” before Figure SU-3-F-3.

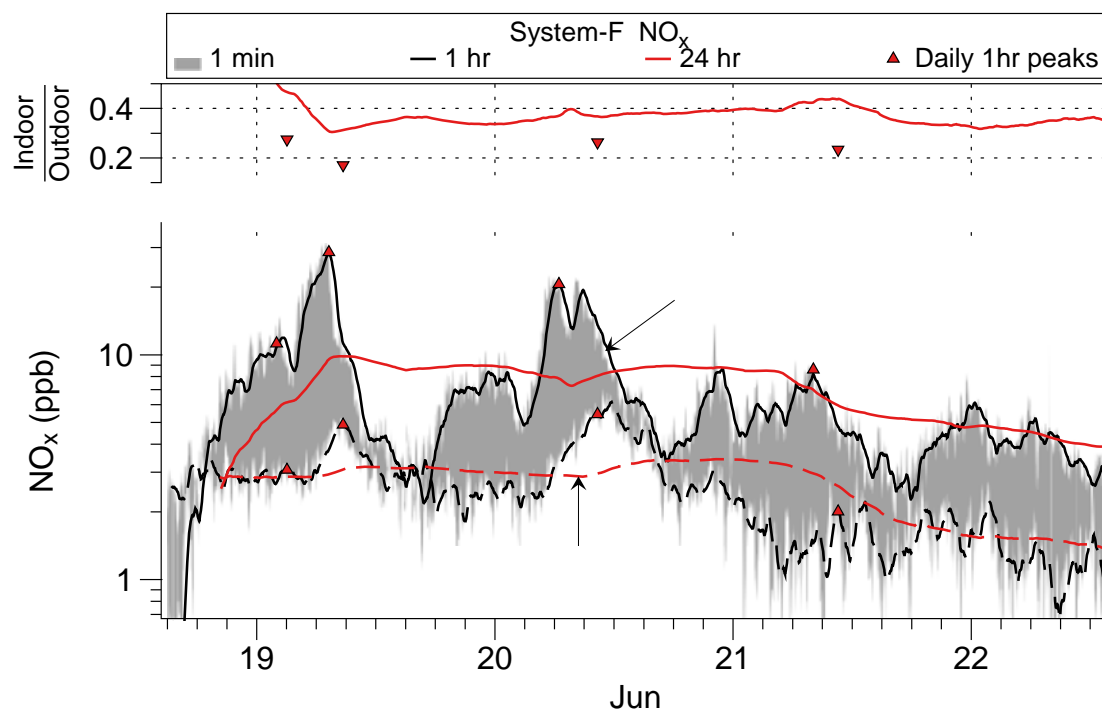


Figure SU-3-F-15. Nitrogen oxides concentrations measured outdoors and indoors during operation of System F, June 18-22, 2014. Data collected using API 200A and 200E chemiluminescence analyzers.

Table SU-3-F-2. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 6 nm to 2.5 micron measured using the TSI 3787 CPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Mean ¹	SD ¹
Outdoor 24h mean	3.7E+3	6.8E+3	1.1E+4	1.1E+4	8.1E+3	3.1E+3
Outdoor 24 SD	1.7E+3	3.2E+3	4.0E+3	7.0E+3	4.0E+3	1.9E+3
Indoor 24h mean	1.5E+2	2.8E+2	4.1E+2	4.3E+2	3.2E+2	1.1E+2
Indoor 24 SD	4.8E+1	1.5E+2	1.8E+2	2.0E+2	1.5E+2	6.0E+1
24h mean In/Out	0.05	0.04	0.04	0.04	0.04	0.00
Highest 8h Outdoor	4.3E+3	9.4E+3	1.4E+4	1.8E+4	1.2E+4	5.3E+3
Highest 8h Indoor	1.7E+2	4.1E+2	6.1E+2	6.7E+2	4.7E+2	2.0E+2
Highest 8 h In/Out	0.04	0.04	0.04	0.04	0.04	0.00
Highest 1h Outdoor	6.3E+3	1.1E+4	1.9E+4	3.2E+4	1.7E+4	9.8E+3
Highest 1 h Indoor	1.7E+2	4.1E+2	6.1E+2	6.7E+2	6.0E+2	2.3E+2
Highest 1h In/Out	0.04	0.05	0.04	0.03	0.04	0.01
Time of highest 1h Outdoor	6/18/14 19:35	6/19/14 16:30	6/20/14 12:33	6/21/14 9:54		
Corresponding highest 1h Indoor	6/18/14 19:51	6/19/14 16:30	6/20/14 13:59	6/21/14 12:16		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/18/2014 20:30, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Table SU-3-F-3. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 100 nm to 2.5 micron measured using the TSI 3781 CPC with size selector.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Mean ¹	SD ¹
Outdoor 24h mean	7.0E+2	8.8E+2	1.1E+3	9.5E+2	8.9E+2	1.3E+2
Outdoor 24 SD	2.8E+2	2.3E+2	6.1E+2	4.4E+2	3.9E+2	1.5E+2
Indoor 24h mean	5.3E+2	5.5E+1	6.9E+1	6.0E+1	1.8E+2	2.0E+2
Indoor 24 SD	1.5E+3	2.0E+1	4.5E+1	3.4E+1	3.9E+2	6.3E+2
24h mean In/Out	2.29	0.23	0.06	0.06	0.66	0.94
Highest 8h Outdoor	8.5E+2	1.1E+3	1.8E+3	1.5E+3	1.3E+3	3.6E+2
Highest 8h Indoor	5.5E+1	7.7E+1	1.3E+2	1.0E+2	9.0E+1	2.6E+1
Highest 8 h In/Out	0.06	0.07	0.07	0.07	0.07	0.00
Highest 1h Outdoor	1.7E+3	1.3E+3	2.4E+3	1.9E+3	1.8E+3	3.9E+2
Highest 1 h Indoor	5.5E+1	7.7E+1	1.3E+2	1.0E+2	1.2E+2	2.9E+1
Highest 1h In/Out	0.05	0.07	0.07	0.07	0.07	0.01
Time of highest 1h Outdoor	6/18/14 18:59	6/19/14 17:57	6/20/14 13:59	6/21/14 14:52		
Corresponding highest 1h Indoor	6/18/14 19:36	6/19/14 17:57	6/20/14 14:44	6/21/14 16:03		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/18/2014 20:30, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Table SU-3-F-4. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 6–100 nm based on difference between concentrations measured using the TSI 3787 CPC and the TSI 3781 CPC with size selector.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Mean ¹	SD ¹
Outdoor 24h mean	2.9E+3	6.0E+3	9.7E+3	1.0E+4	7.2E+3	3.0E+3
Outdoor 24 SD	1.6E+3	3.1E+3	3.7E+3	6.9E+3	3.8E+3	1.9E+3
Indoor 24h mean	1.1E+2	2.2E+2	3.4E+2	3.7E+2	2.6E+2	1.0E+2
Indoor 24 SD	3.5E+1	1.4E+2	1.4E+2	1.8E+2	1.2E+2	5.5E+1
24h mean In/Out	0.04	0.04	0.04	0.04	0.04	0.00
Highest 8h Outdoor	3.5E+3	8.5E+3	1.3E+4	1.7E+4	1.0E+4	5.0E+3
Highest 8h Indoor	1.2E+2	3.4E+2	4.6E+2	5.8E+2	3.8E+2	1.7E+2
Highest 8 h In/Out	0.04	0.04	0.04	0.03	0.04	0.00
Highest 1h Outdoor	5.1E+3	9.5E+3	1.7E+4	3.1E+4	1.6E+4	9.9E+3
Highest 1 h Indoor	1.2E+2	3.4E+2	4.6E+2	5.8E+2	4.9E+2	2.4E+2
Highest 1h In/Out	0.03	0.04	0.04	0.02	0.03	0.01
Time of highest 1h Outdoor	6/18/14 19:46	6/19/14 21:19	6/20/14 12:31	6/21/14 9:54		
Corresponding highest 1h Indoor	6/18/14 19:57	6/19/14 21:19	6/20/14 13:36	6/21/14 12:14		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/18/2014 20:30, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Table SU-3-F-5. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 100–300 nm based on difference between concentrations measured using the TSI 3781 CPC with size selector and the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Mean ¹	SD ¹
Outdoor 24h mean	2.9E+3	6.0E+3	9.7E+3	1.0E+4	7.2E+3	3.0E+3
Outdoor 24 SD	1.6E+3	3.1E+3	3.7E+3	6.9E+3	3.8E+3	1.9E+3
Indoor 24h mean	1.1E+2	2.2E+2	3.4E+2	3.7E+2	2.6E+2	1.0E+2
Indoor 24 SD	3.5E+1	1.4E+2	1.4E+2	1.8E+2	1.2E+2	5.5E+1
24h mean In/Out	0.04	0.04	0.04	0.04	0.04	0.00
Highest 8h Outdoor	3.5E+3	8.5E+3	1.3E+4	1.7E+4	1.0E+4	5.0E+3
Highest 8h Indoor	1.2E+2	3.4E+2	4.6E+2	5.8E+2	3.8E+2	1.7E+2
Highest 8 h In/Out	0.04	0.04	0.04	0.03	0.04	0.00
Highest 1h Outdoor	5.1E+3	9.5E+3	1.7E+4	3.1E+4	1.6E+4	9.9E+3
Highest 1 h Indoor	1.2E+2	3.4E+2	4.6E+2	5.8E+2	4.9E+2	2.4E+2
Highest 1h In/Out	0.03	0.04	0.04	0.02	0.03	0.01
Time of highest 1h Outdoor	6/18/14 19:46	6/19/14 21:19	6/20/14 12:31	6/21/14 9:54		
Corresponding highest 1h Indoor	6/18/14 19:57	6/19/14 21:19	6/20/14 13:36	6/21/14 12:14		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/18/2014 20:30, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Table SU-3-F-6. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.3–0.4 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Mean ¹	SD ¹
Outdoor 24h mean	6.7E+3	8.7E+3	1.1E+4	1.1E+4	9.4E+3	1.8E+3
Outdoor 24 SD	2.5E+3	2.6E+3	4.5E+3	2.7E+3	3.1E+3	8.2E+2
Indoor 24h mean	5.0E+2	5.6E+2	7.8E+2	6.9E+2	6.3E+2	1.1E+2
Indoor 24 SD	1.4E+2	1.7E+2	2.4E+2	1.7E+2	1.8E+2	3.8E+1
24h mean In/Out	0.08	0.07	0.07	0.07	0.07	0.01
Highest 8h Outdoor	9.6E+3	1.1E+4	1.4E+4	1.3E+4	1.2E+4	1.6E+3
Highest 8h Indoor	7.2E+2	8.1E+2	1.0E+3	9.0E+2	8.6E+2	1.1E+2
Highest 8 h In/Out	0.07	0.07	0.07	0.07	0.07	0.00
Highest 1h Outdoor	1.3E+4	1.4E+4	2.4E+4	1.7E+4	1.7E+4	4.3E+3
Highest 1 h Indoor	7.2E+2	8.1E+2	1.0E+3	9.0E+2	1.0E+3	2.3E+2
Highest 1h In/Out	0.06	0.06	0.06	0.06	0.06	0.00
Time of highest 1h Outdoor	6/18/14 16:34	6/19/14 21:39	6/20/14 20:00	6/21/14 22:20		
Corresponding highest 1h Indoor	6/18/14 17:02	6/19/14 22:21	6/20/14 20:32	6/21/14 22:26		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/18/2014 20:30, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Table SU-3-F-7. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.4–0.5 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Mean ¹	SD ¹
Outdoor 24h mean	1.2E+3	1.7E+3	2.1E+3	2.7E+3	1.9E+3	5.6E+2
Outdoor 24 SD	3.1E+2	5.6E+2	7.8E+2	9.5E+2	6.5E+2	2.4E+2
Indoor 24h mean	7.9E+1	9.9E+1	1.3E+2	1.6E+2	1.2E+2	2.9E+1
Indoor 24 SD	1.5E+1	2.8E+1	3.3E+1	3.9E+1	2.9E+1	8.9E+0
24h mean In/Out	0.09	0.06	0.06	0.06	0.07	0.01
Highest 8h Outdoor	1.2E+3	2.2E+3	2.6E+3	3.3E+3	2.3E+3	7.7E+2
Highest 8h Indoor	7.6E+1	1.4E+2	1.5E+2	2.2E+2	1.5E+2	5.0E+1
Highest 8 h In/Out	0.06	0.07	0.06	0.07	0.06	0.00
Highest 1h Outdoor	1.6E+3	2.7E+3	4.2E+3	4.6E+3	3.3E+3	1.2E+3
Highest 1 h Indoor	7.6E+1	1.4E+2	1.5E+2	2.2E+2	1.8E+2	5.9E+1
Highest 1h In/Out	0.06	0.05	0.05	0.05	0.06	0.00
Time of highest 1h Outdoor	6/18/14 16:34	6/19/14 21:38	6/20/14 20:10	6/21/14 22:20		
Corresponding highest 1h Indoor	6/18/14 16:56	6/19/14 22:25	6/20/14 20:34	6/21/14 22:32		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/18/2014 20:30, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Table SU-3-F-8. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.5–0.7 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Mean ¹	SD ¹
Outdoor 24h mean	1.0E+3	1.9E+3	2.2E+3	3.6E+3	2.2E+3	9.2E+2
Outdoor 24 SD	4.2E+2	7.5E+2	8.1E+2	1.1E+3	7.8E+2	2.5E+2
Indoor 24h mean	5.8E+1	1.0E+2	1.1E+2	1.7E+2	1.1E+2	4.1E+1
Indoor 24 SD	1.7E+1	3.5E+1	3.0E+1	4.1E+1	3.1E+1	9.0E+0
24h mean In/Out	0.09	0.05	0.05	0.05	0.06	0.02
Highest 8h Outdoor	1.3E+3	2.5E+3	3.2E+3	4.3E+3	2.8E+3	1.1E+3
Highest 8h Indoor	7.0E+1	1.4E+2	1.4E+2	2.4E+2	1.5E+2	6.0E+1
Highest 8 h In/Out	0.06	0.06	0.05	0.06	0.05	0.00
Highest 1h Outdoor	1.7E+3	3.3E+3	3.6E+3	5.2E+3	3.4E+3	1.3E+3
Highest 1 h Indoor	7.0E+1	1.4E+2	1.4E+2	2.4E+2	1.6E+2	6.0E+1
Highest 1h In/Out	0.05	0.05	0.04	0.05	0.05	0.00
Time of highest 1h Outdoor	6/19/14 2:00	6/19/14 21:36	6/20/14 7:32	6/21/14 22:20		
Corresponding highest 1h Indoor	6/19/14 2:45	6/19/14 21:58	6/20/14 9:17	6/21/14 22:25		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/18/2014 20:30, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Table SU-3-F-9. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.7–1.0 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Mean ¹	SD ¹
Outdoor 24h mean	4.3E+2	9.5E+2	1.1E+3	1.8E+3	1.1E+3	5.1E+2
Outdoor 24 SD	2.4E+2	4.1E+2	4.6E+2	5.1E+2	4.0E+2	1.0E+2
Indoor 24h mean	1.9E+1	4.4E+1	4.2E+1	7.3E+1	4.4E+1	1.9E+1
Indoor 24 SD	7.8E+0	2.4E+1	1.5E+1	1.7E+1	1.6E+1	5.7E+0
24h mean In/Out	0.07	0.04	0.04	0.04	0.05	0.01
Highest 8h Outdoor	5.5E+2	1.2E+3	1.6E+3	2.2E+3	1.4E+3	5.9E+2
Highest 8h Indoor	2.7E+1	5.6E+1	5.9E+1	8.0E+1	5.6E+1	1.9E+1
Highest 8 h In/Out	0.05	0.05	0.04	0.04	0.04	0.01
Highest 1h Outdoor	8.0E+2	1.6E+3	1.9E+3	2.5E+3	1.7E+3	6.3E+2
Highest 1 h Indoor	2.7E+1	5.6E+1	5.9E+1	8.0E+1	6.6E+1	2.7E+1
Highest 1h In/Out	0.04	0.04	0.03	0.04	0.04	0.00
Time of highest 1h Outdoor	6/19/14 2:00	6/19/14 21:37	6/20/14 8:20	6/22/14 2:00		
Corresponding highest 1h Indoor	6/19/14 2:53	6/19/14 22:18	6/20/14 8:58	6/22/14 5:50		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/18/2014 20:30, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Table SU-3-F-10. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 1.0–2.5 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Mean ¹	SD ¹
Outdoor 24h mean	3.7E+2	7.8E+2	9.0E+2	1.5E+3	8.8E+2	3.9E+2
Outdoor 24 SD	1.7E+2	3.1E+2	3.3E+2	3.4E+2	2.8E+2	6.9E+1
Indoor 24h mean	1.2E+1	4.4E+1	2.7E+1	4.3E+1	3.1E+1	1.3E+1
Indoor 24 SD	4.8E+0	7.5E+1	8.0E+0	9.1E+0	2.4E+1	2.9E+1
24h mean In/Out	0.05	0.05	0.04	0.03	0.04	0.01
Highest 8h Outdoor	4.6E+2	1.0E+3	1.3E+3	1.7E+3	1.1E+3	4.5E+2
Highest 8h Indoor	1.7E+1	3.5E+1	3.5E+1	4.6E+1	3.3E+1	1.1E+1
Highest 8 h In/Out	0.04	0.03	0.03	0.03	0.03	0.00
Highest 1h Outdoor	6.2E+2	1.3E+3	1.5E+3	1.9E+3	1.3E+3	4.7E+2
Highest 1 h Indoor	1.7E+1	3.5E+1	3.5E+1	4.6E+1	3.9E+1	1.4E+1
Highest 1h In/Out	0.03	0.03	0.03	0.03	0.03	0.00
Time of highest 1h Outdoor	6/19/14 2:00	6/19/14 21:37	6/20/14 8:46	6/22/14 1:05		
Corresponding highest 1h Indoor	6/19/14 2:52	6/19/14 21:51	6/20/14 9:54	6/22/14 4:13		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/18/2014 20:30, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Table SU-3-F-11. Summary statistics for estimated PM_{2.5} concentrations (µg m⁻³) calculated from particle number concentrations resolved by size from 6 nm to 2.5 microns (as reported in Tables SU-3-F-2 to SU-3-F-9) and resulting indoor/outdoor ratios.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Mean ¹	SD ¹
Outdoor 24h mean	6.4E+0	1.1E+1	1.3E+1	1.7E+1	1.2E+1	3.7E+0
Outdoor 24 SD	1.6E+0	2.5E+0	3.8E+0	3.1E+0	2.7E+0	7.9E-1
Indoor 24h mean	3.2E-1	5.9E-1	5.7E-1	6.8E-1	5.4E-1	1.3E-1
Indoor 24 SD	6.4E-2	5.2E-1	2.0E-1	1.5E-1	2.3E-1	1.7E-1
24h mean In/Out	0.06	0.05	0.05	0.04	0.05	0.01
Highest 8h Outdoor	7.0E+0	1.2E+1	1.7E+1	1.9E+1	1.4E+1	4.6E+0
Highest 8h Indoor	3.2E-1	5.4E-1	8.0E-1	8.3E-1	6.2E-1	2.1E-1
Highest 8 h In/Out	0.05	0.04	0.05	0.04	0.05	0.00
Highest 1h Outdoor	1.0E+1	1.6E+1	1.9E+1	2.3E+1	1.7E+1	4.7E+0
Highest 1 h Indoor	3.2E-1	5.4E-1	8.0E-1	8.3E-1	7.6E-1	2.1E-1
Highest 1h In/Out	0.05	0.04	0.05	0.04	0.05	0.00
Time of highest 1h Outdoor	6/18/14 19:13	6/19/14 21:26	6/20/14 13:56	6/21/14 11:53		
Corresponding highest 1h Indoor	6/18/14 19:47	6/19/14 21:47	6/20/14 14:56	6/21/14 15:53		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/18/2014 20:30, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Table SU-3-F-12. Summary statistics for concentrations of PM_{2.5} (µg m⁻³) and indoor /outdoor ratios from measurements reported by TSI DustTrak II.

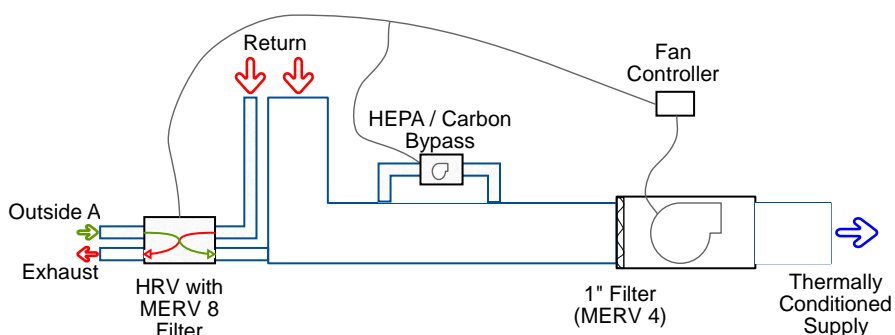
Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Mean ¹	SD ¹
Outdoor 24h mean	5.4E-3	8.5E-3	9.0E-3	1.2E-2	8.7E-3	2.3E-3
Outdoor 24 SD	2.1E-3	2.3E-3	3.1E-3	2.6E-3	2.5E-3	3.8E-4
Indoor 24h mean	2.7E-2	1.8E-3	2.0E-3	1.1E-3	8.0E-3	1.1E-2
Indoor 24 SD	8.2E-2	2.4E-3	1.4E-3	4.9E-4	2.2E-2	3.5E-2
24h mean In/Out	17.72	1.23	0.25	0.14	4.84	7.45
Highest 8h Outdoor	6.2E-3	1.0E-2	1.1E-2	1.4E-2	1.0E-2	2.7E-3
Highest 8h Indoor	1.1E-3	4.7E-3	2.0E-3	1.2E-3	2.2E-3	1.5E-3
Highest 8 h In/Out	0.18	0.46	0.17	0.08	0.22	0.14
Highest 1h Outdoor	1.1E-2	1.3E-2	1.4E-2	1.6E-2	1.3E-2	1.6E-3
Highest 1 h Indoor	1.1E-3	4.7E-3	2.0E-3	1.2E-3	4.0E-3	3.7E-3
Highest 1h In/Out	0.12	0.78	0.15	0.14	0.30	0.28
Time of highest 1h Outdoor	6/18/14 14:18	6/19/14 21:32	6/20/14 19:52	6/21/14 23:05		
Corresponding highest 1h Indoor	6/18/14 15:31	6/20/14 0:58	6/20/14 23:52	6/22/14 0:02		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/18/2014 20:30, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Table SU-3-F-13. Daily¹ summary statistics for concentrations (nanograms m⁻³) and indoor /outdoor ratios of aerosol black carbon measured using the Aethalometer AE22.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Mean ¹	SD ¹
Outdoor 24h mean	2.2E+2	2.8E+2	2.7E+2	1.5E+2	2.3E+2	5.1E+1
Outdoor 24 SD	1.2E+2	2.0E+2	2.1E+2	1.1E+2	1.6E+2	4.5E+1
Indoor 24h mean	1.4E+2	3.4E+1	2.9E+1	1.9E+1	5.6E+1	4.9E+1
Indoor 24 SD	3.2E+2	3.4E+1	2.3E+1	1.6E+1	9.9E+1	1.3E+2
24h mean In/Out	1.41	0.23	0.11	0.12	0.47	0.55
Highest 8h Outdoor	3.6E+2	4.8E+2	3.9E+2	2.1E+2	3.6E+2	1.0E+2
Highest 8h Indoor	1.1E+3	3.9E+1	4.0E+1	3.0E+1	2.9E+2	4.4E+2
Highest 8 h In/Out	2.96	0.08	0.10	0.14	0.82	1.24
Highest 1h Outdoor	4.4E+2	8.9E+2	5.5E+2	3.2E+2	5.5E+2	2.1E+2
Highest 1 h Indoor	1.1E+3	3.9E+1	4.0E+1	3.0E+1	4.8E+1	1.2E+1
Highest 1h In/Out	0.14	0.05	0.10	0.10	0.10	0.03
Time of highest 1h Outdoor	6/19/14 2:00	6/19/14 7:18	6/20/14 20:06	6/21/14 21:42		
Corresponding highest 1h Indoor	6/19/14 6:00	6/19/14 7:27	6/20/14 20:48	6/22/14 1:33		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/18/2014 20:30, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Appendix SU-4-G. Results for System G, June 25-July 2, 2014.**Table SU-4-G-1.** Description of **System G** component characteristics during the period of **June 25-July 2, 2014**.

System Parameter	Description or Measured Value
Heating	75,000 BTU/h, 80% eff., gas furnace, 1-stage burner
Cooling	3 ton, SEER13 air conditioner
Thermal distribution	Central fan with PSC motor: 1200 cfm for cooling, 1074 cfm for heating
Ventilation	HRV system (set to deliver 114 cfm when on) that operates with the fan cyclers providing 20 min of operation per hour.
Filtration	MERV4, 1" (Purolator F312) filter installed inside the FAU cabinet. HEPA bypass unit (180 cfm Lennox HEPA-20) drawing air from the return plenum and discharging at the entrance to the FAU. The fan cyclers operate the HEPA bypass for 20 min out of every hour.
Recirculation blower schedule	As required for thermal conditioning, with fan cyclers providing a minimum of 20 minutes per hour.
VOC removal system	Activated carbon canister with the HEPA bypass system.

Notes about this monitoring period

There were no major instrument problems for this operational period. The DustTraks had problems with many numbers near the apparent DL.

The 24 h running statistics in the figures starts at 6/26/2014 20:00. Data from 6/27/2014 06:00 to 6/29/2014 08:00 was censored from the two largest Met1 channels due to indoor activity associated with changing sorbent tubes.

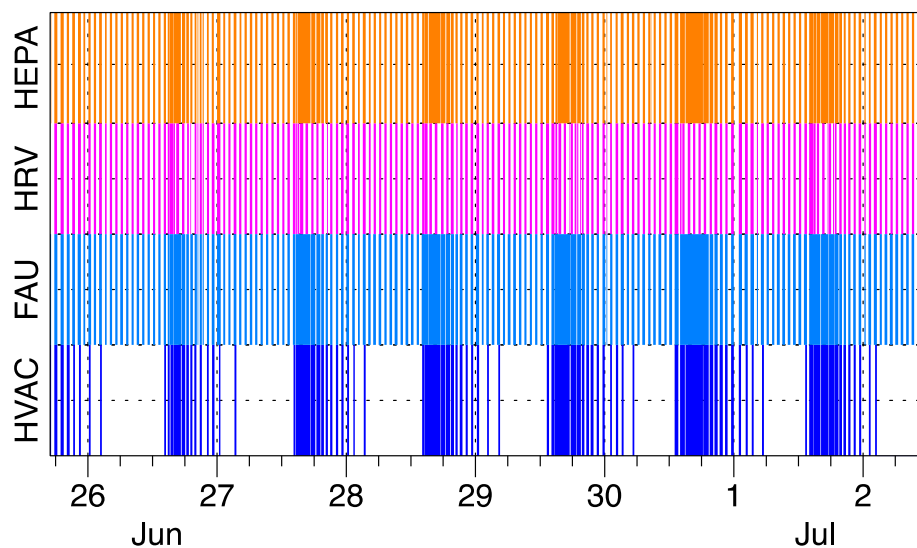


Figure SU-4-G-1. Operation of mechanical systems: HEPA bypass system; HRV system; fan on central forced air unit (FAU); central air-conditioning (AC).

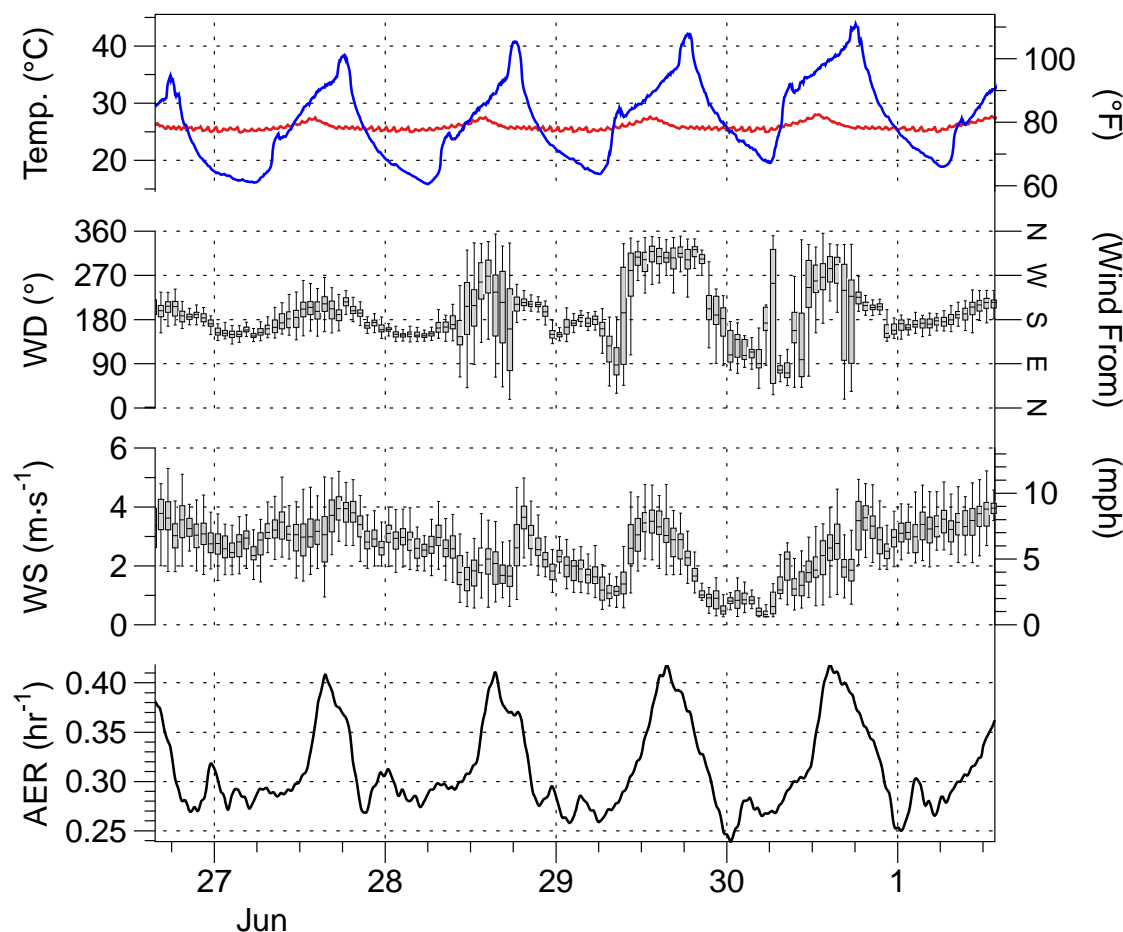


Figure SU-4-G-2. Environmental parameters measured during operation of System G, June 25-July 2, 2014. From top to bottom: indoor (red) and outdoor (blue) temperatures, wind direction (WD) in units of degrees from North, wind speed (WS), and air exchange rate (AER). For WD and WS, the box for each hour shows the 25th, 50th and 75th percentiles of the measured values and whiskers extend 1.5X the interquartile range (75th–25th percentile values) above the 75th and below the 25th percentile values.

Guide to plots of pollutant concentration time series and indoor / outdoor (I/O) ratios

The bottom section of each plot shows outdoor and indoor time series using the resolution of data collection: 3-min for black carbon and 1-min for all other parameters. The top and bottom of grey band are LOESS-smoothed, 1-min (or 3-min for black carbon) time-series. Also shown are time series with 1h and 24h time averaging for most pollutants and 1h and 8h average for ozone. Triangles in bottom of plot indicate the highest 1h outdoor and corresponding highest 1h indoor average during each day. The top section of each plot shows the ratio of indoor to outdoor running 24h mean values (8h for ozone) and the ratios of highest 1h indoor to corresponding highest 1h outdoor concentration each day.

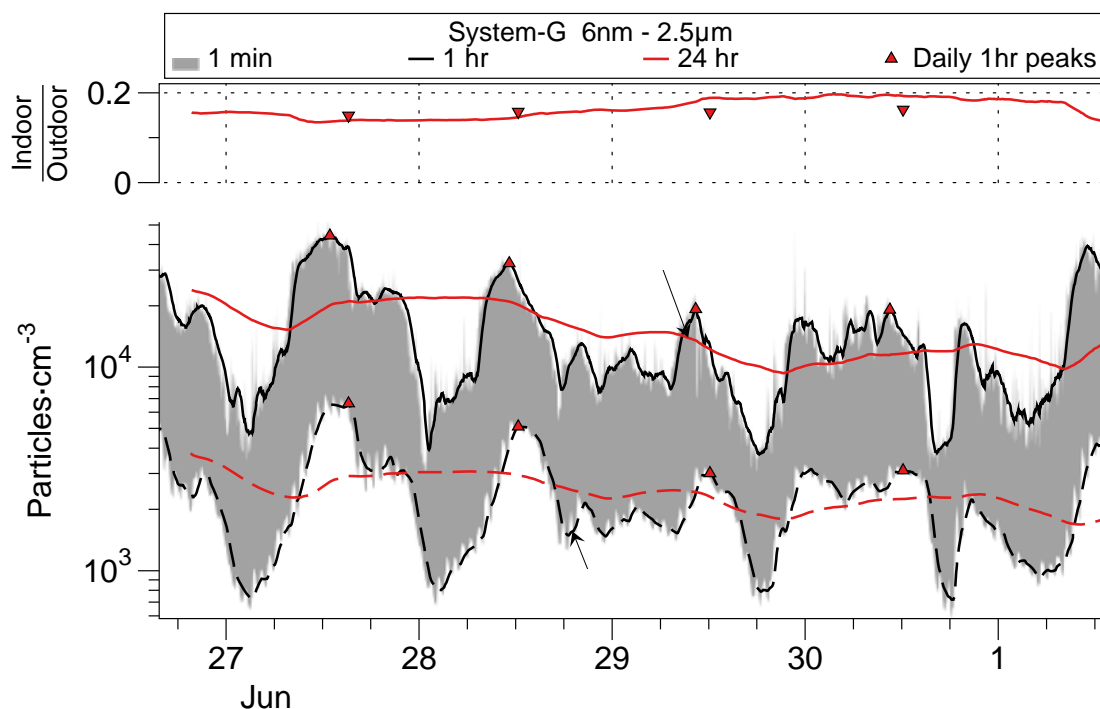


Figure SU-4-G-3. Number concentrations of 6 nm to 2.5 μ m diameter particles measured outdoors and indoors during operation of System G, June 25-July 2, 2014. Data collected using TSI 3787 CPCs. Refer to “Guide” before Figure SU-4-G-3.

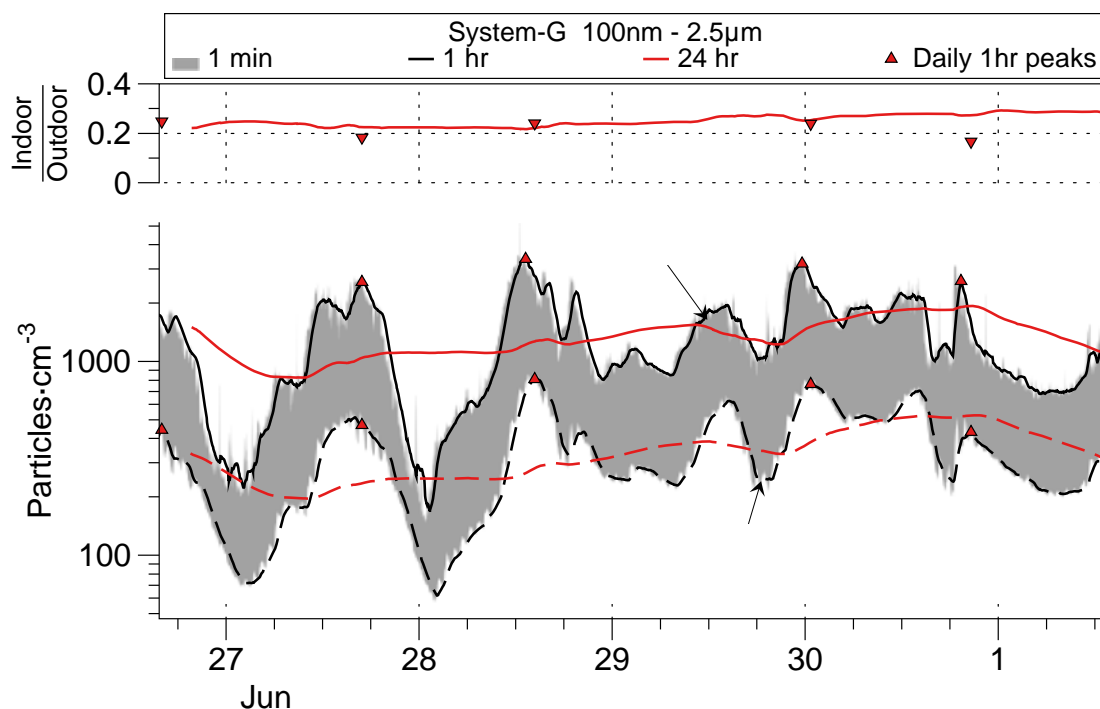


Figure SU-4-G-4. Number concentrations of 100 nm to 2.5 μ m diameter particles measured outdoors and indoors during operation of System G, June 25-July 2, 2014. Data collected using TSI 3781 CPCs outfitted with screens to exclude particles smaller than 100 nm. Refer to “Guide” before Figure SU-4-G-3.

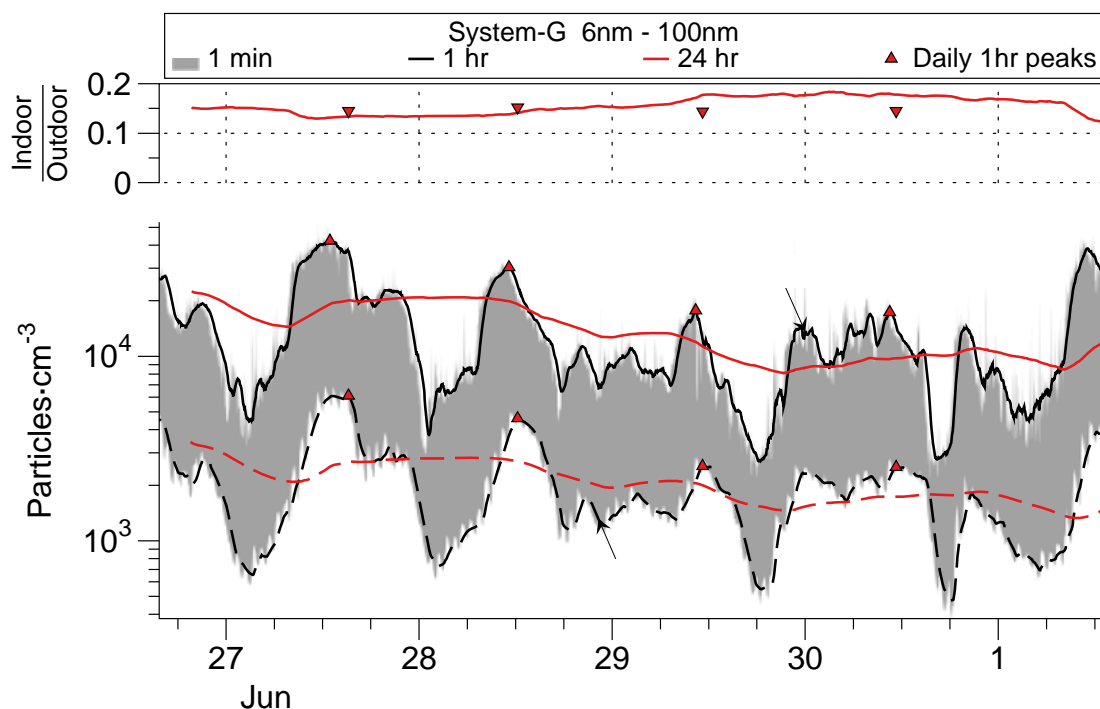


Figure SU-4-G-5. Number concentrations of 6–100 nm diameter particles measured outdoors and indoors during operation of System G, June 25–July 2, 2014. Data obtained as the difference between time series show in prior two figures. Refer to “Guide” before Figure SU-4-G-3.

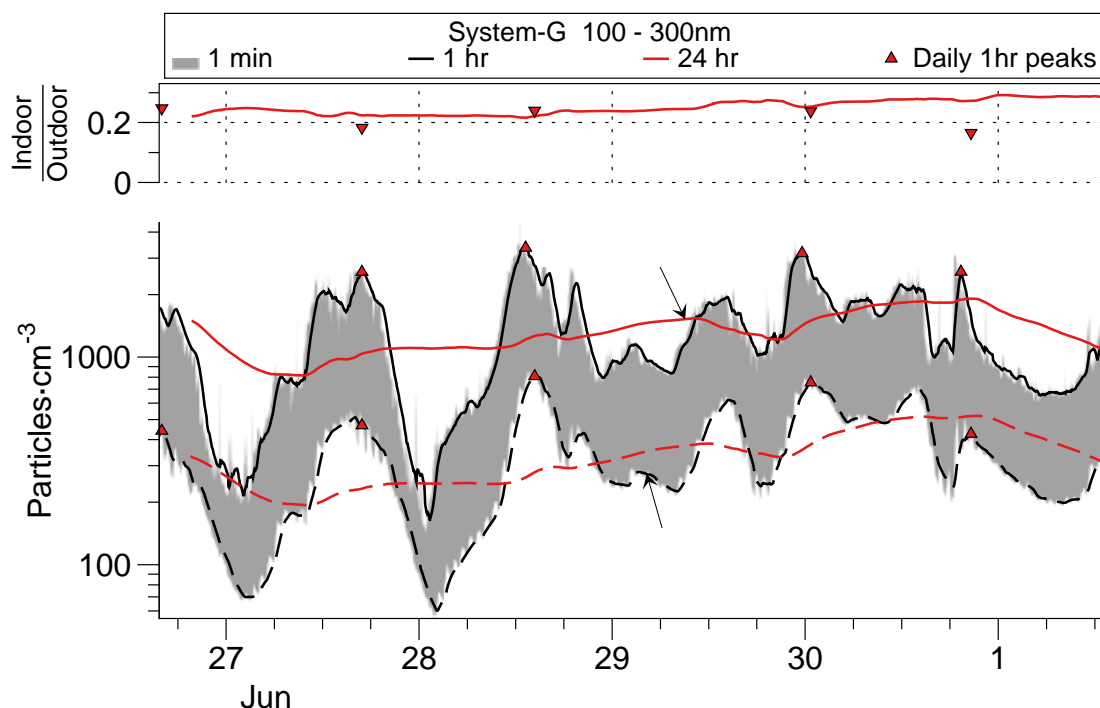


Figure SU-4-G-6. Number concentrations of 100–300 nm diameter particles measured outdoors and indoors during operation of System G, June 25–July 2, 2014. Data obtained as the difference between the TSI 3781 CPC with size selector and the MetOne BT637S OPC. Refer to “Guide” before Figure SU-4-G-3.

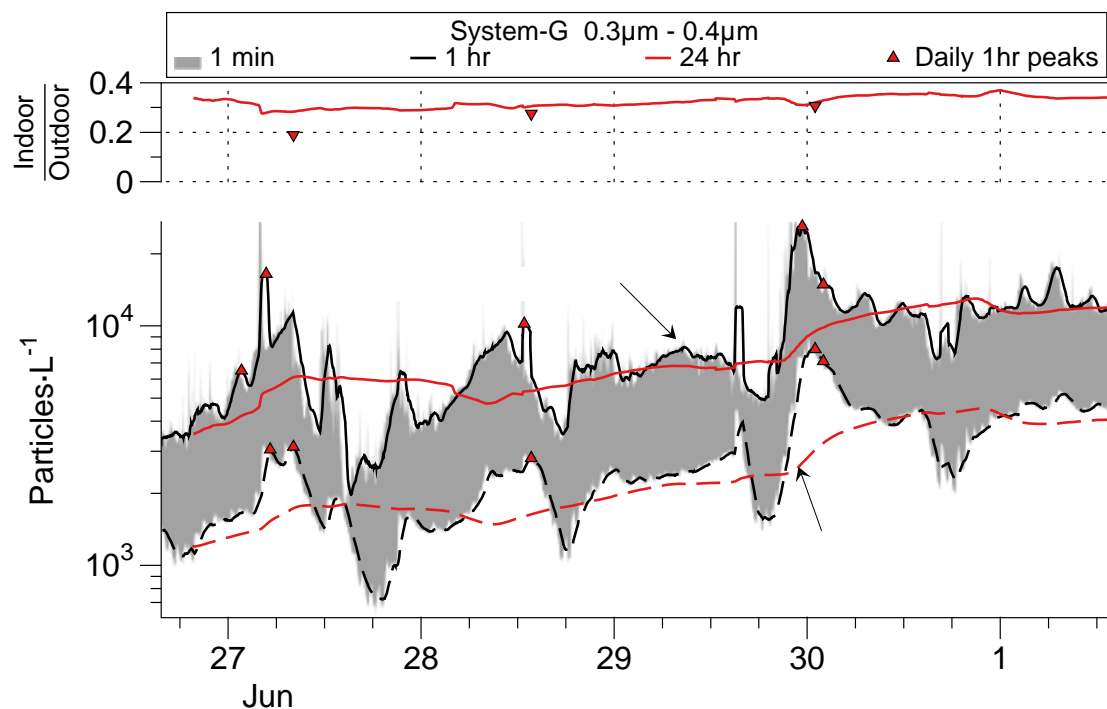


Figure SU-4-G-7. Number concentrations of 0.3–0.4 μm diameter particles measured outdoors and indoors during operation of System G, June 25–July 2, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-4-G-3.

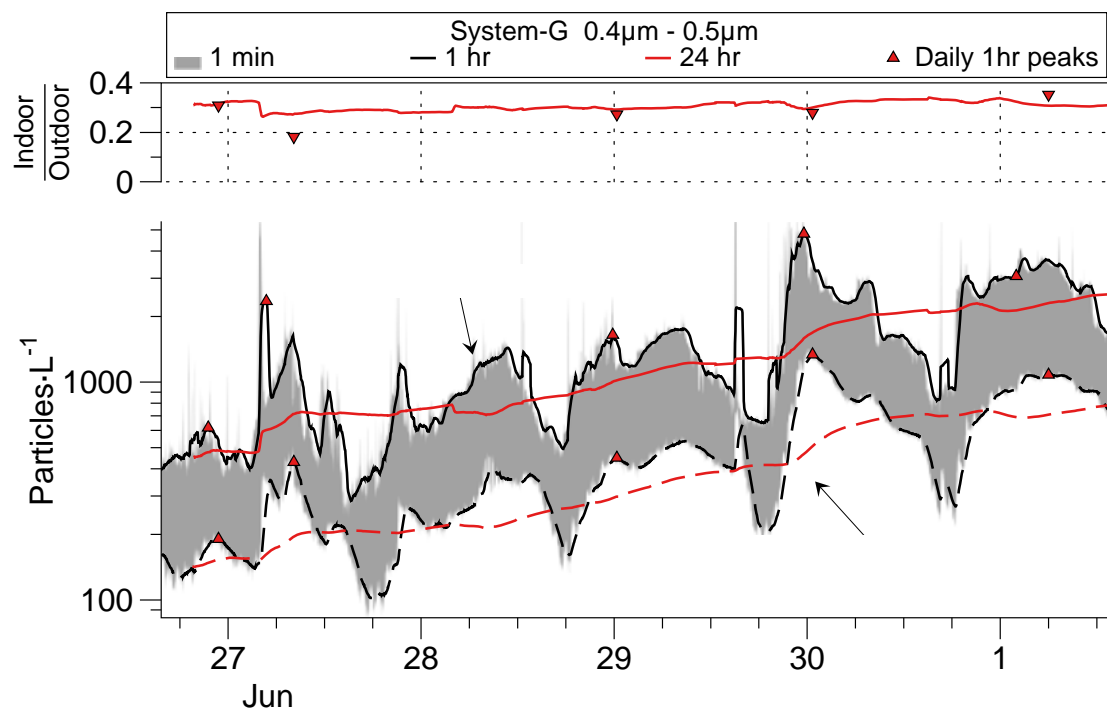


Figure SU-4-G-8. Number concentrations of 0.4–0.5 μm diameter particles measured outdoors and indoors during operation of System G, June 25–July 2, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-4-G-3.

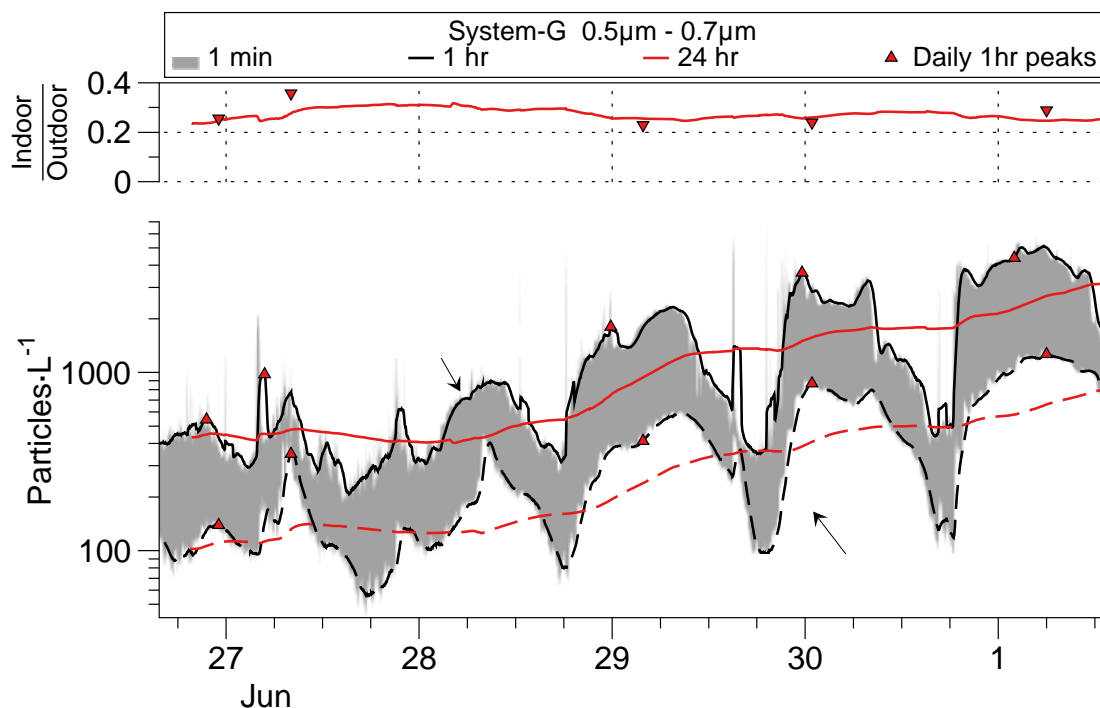


Figure SU-4-G-9. Number concentrations of 0.5–0.7 μm diameter particles measured outdoors and indoors during operation of System G, June 25–July 2, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-4-G-3.

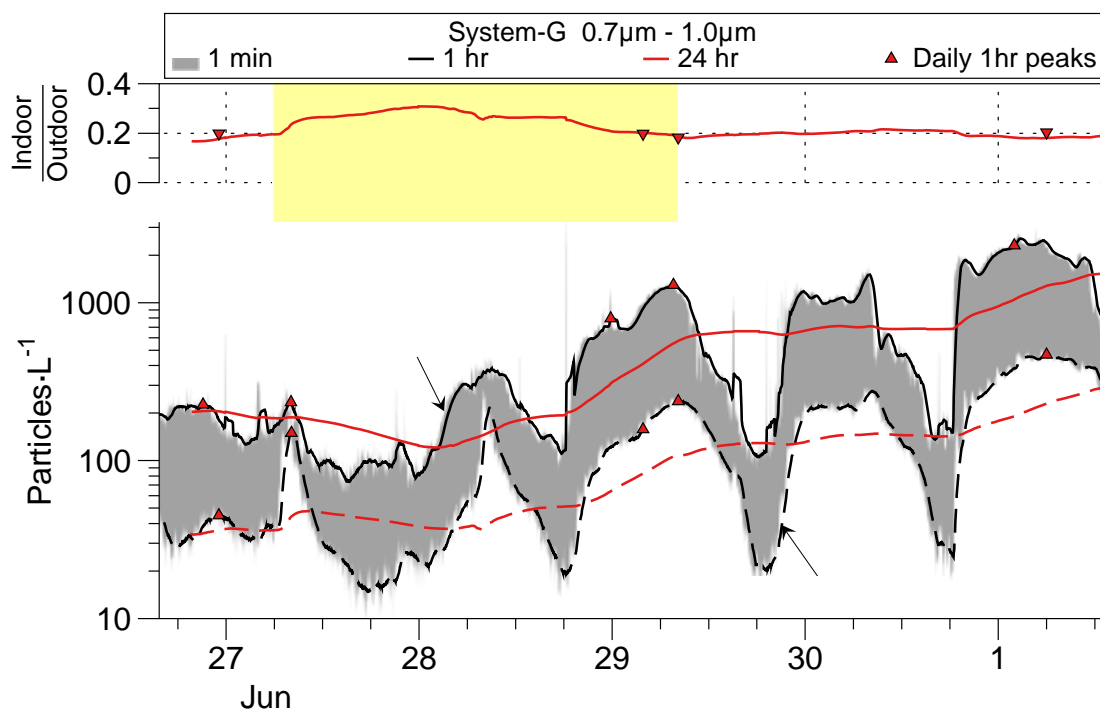


Figure SU-4-G-10. Number concentrations of 0.7–01.0 μm diameter particles measured outdoors and indoors during operation of System G, June 25-July 2, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-4-G-3. The yellow band indicates censored data due to in house activity.

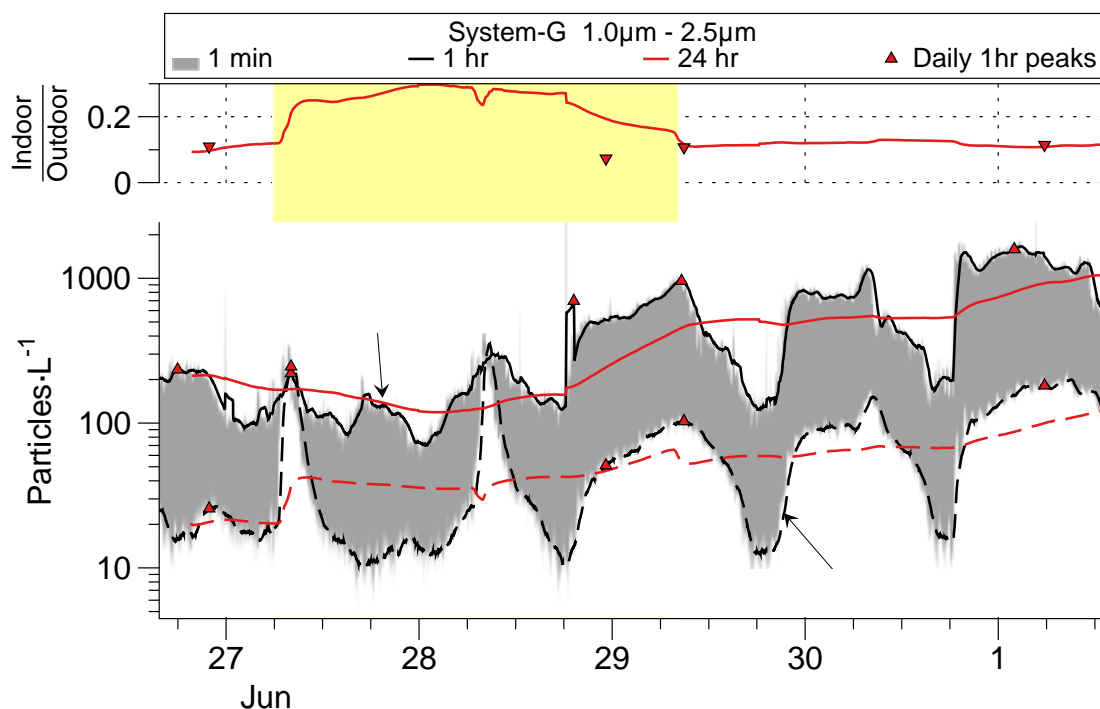


Figure SU-4-G-11. Number concentrations of 1.0–2.5 μm diameter particles measured outdoors and indoors during operation of System G, June 25–July 2, 2014. Data collected using MetOne BT637S particle counters. Refer to Figure SU-4-G-3 for details. The yellow band indicates censored data due to in house activity.

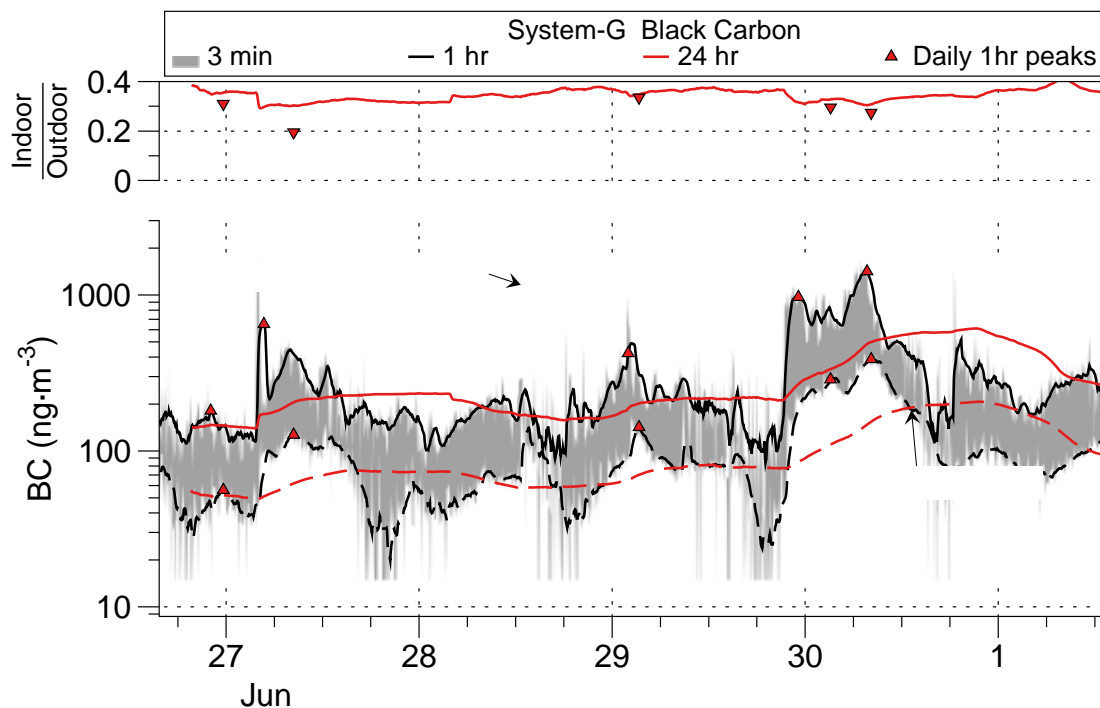


Figure SU-4-G-12. Black carbon concentrations measured outdoors and indoors during operation of System G, June 25–July 2, 2014. Data collected using AE22 Aethalometers with 3-min samples. Data otherwise as described in Figure SU-4-G-3 caption.

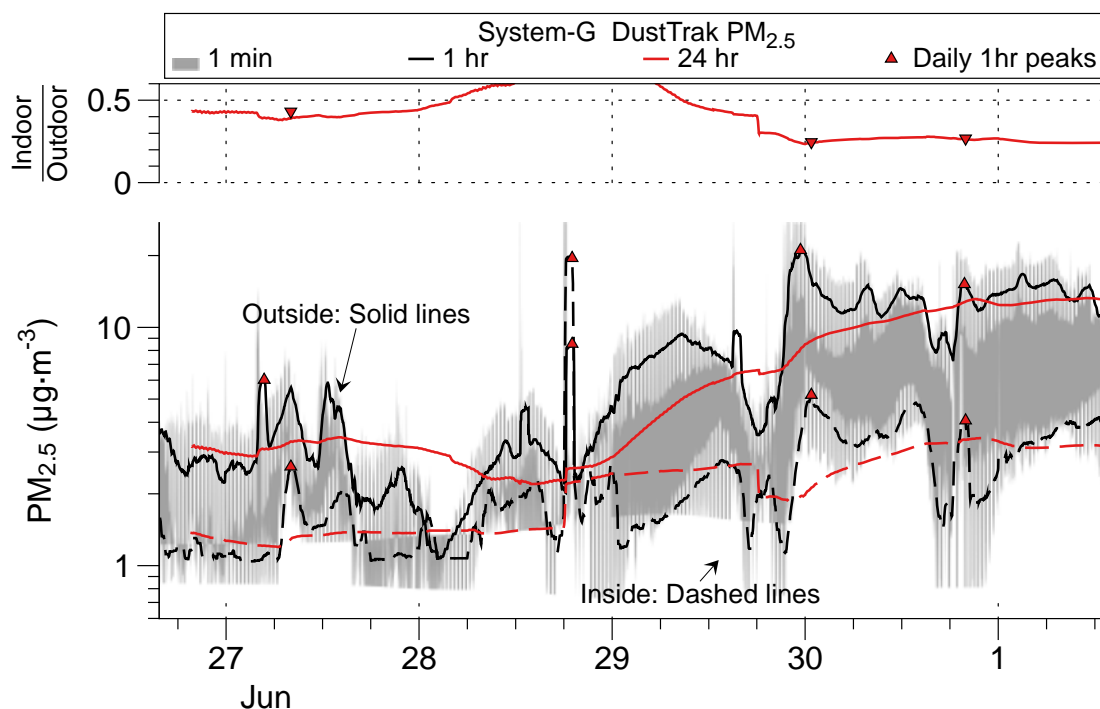


Figure SU-4-G-13. PM_{2.5} reported by TSI DustTrak II 8530 measurements outdoors and indoors during operation of System G, June 25-July 2, 2014. The DustTrak measures light scattering and uses a calibration to estimate PM_{2.5} mass. Refer to “Guide” before Figure SU-4-G-3.

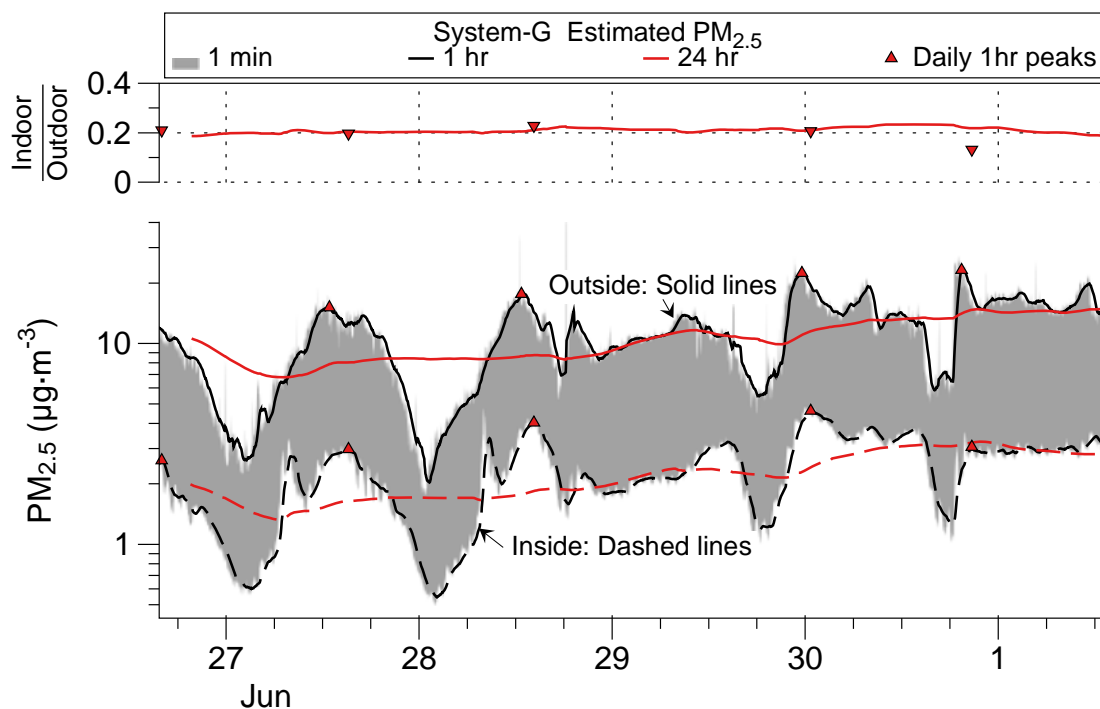


Figure SU-4-G-14. Estimated PM_{2.5} concentration calculated from size-resolved particle number concentrations measured by MetOne and CPC during operation of System G, June 25-July 2, 2014. Details provided in body of report. Refer to “Guide” before Figure SU-4-G-3.

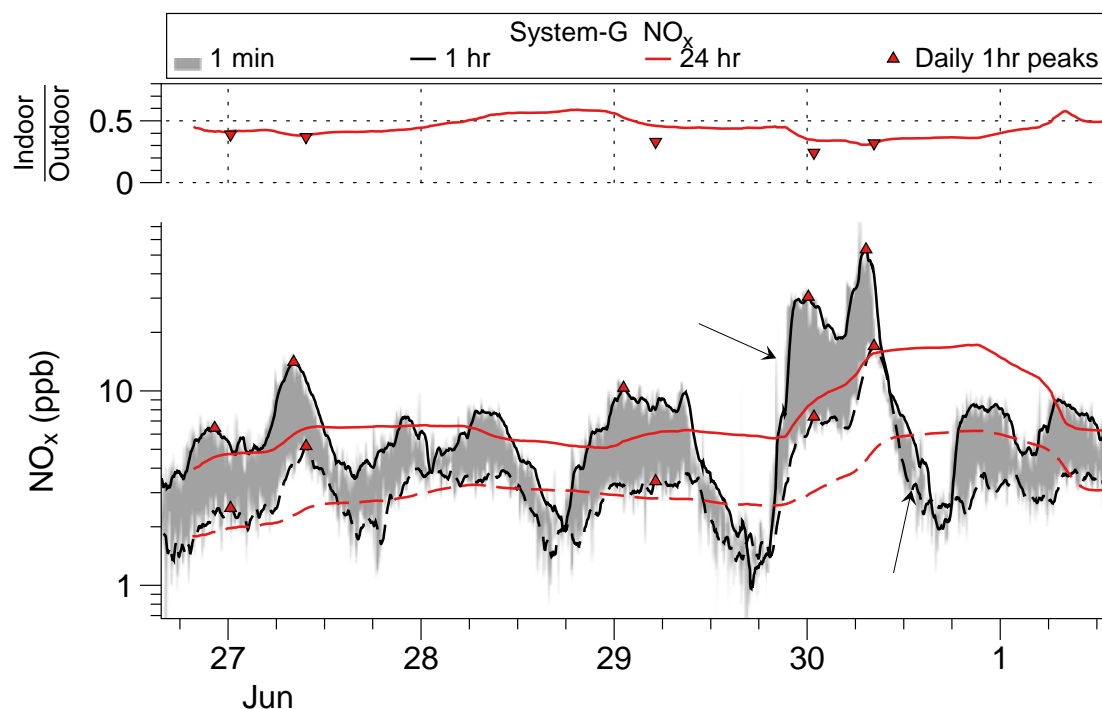


Figure SU-4-G-15. Nitrogen oxides concentrations measured outdoors and indoors during operation of System G, June 25-July 2, 2014. Data collected using API 200A and 200E chemiluminescence analyzers.

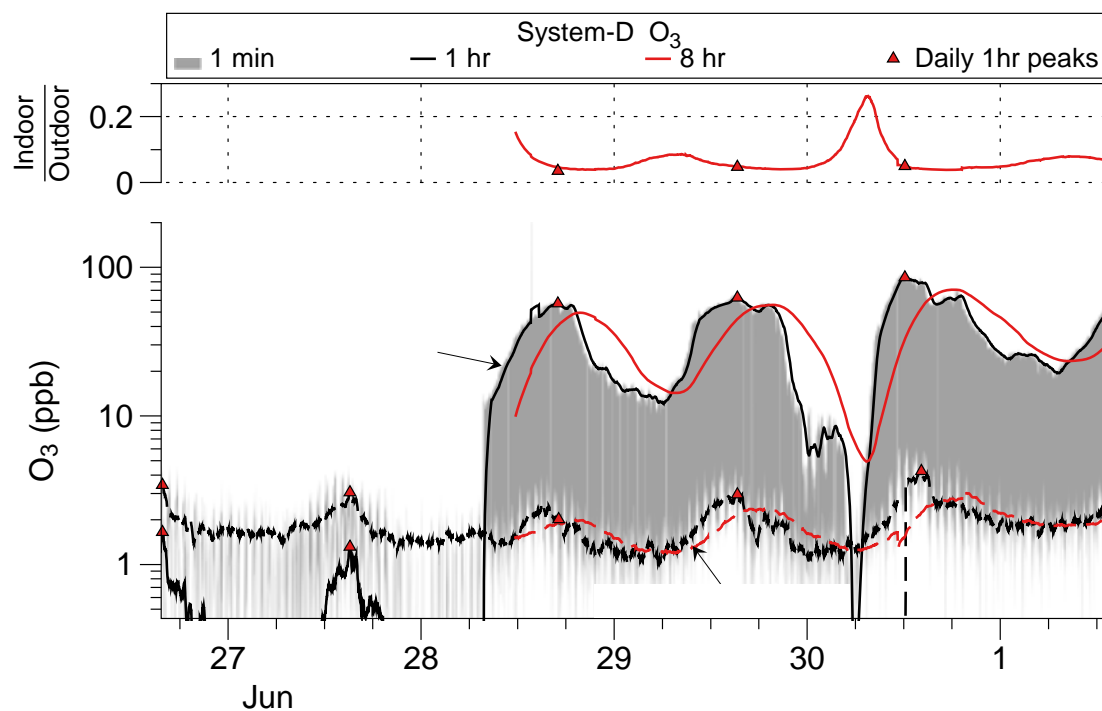


Figure SU-4-G-16. Ozone concentrations measured outdoors and indoors during operation of System G, June 25-July 2, 2014. Data collected using 2B Technologies Model 202 analyzers.

Table SU-4-G-2. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 6 nm to 2.5 micron measured using the TSI 3787 CPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Mean ¹	SD ¹
Outdoor 24h mean	1.8E+4	2.2E+4	1.5E+4	1.0E+4	1.2E+4	1.5E+4	4.2E+3
Outdoor 24 SD	8.5E+3	1.3E+4	7.7E+3	4.7E+3	4.8E+3	7.7E+3	3.0E+3
Indoor 24h mean	2.8E+3	3.0E+3	2.3E+3	2.0E+3	2.1E+3	2.5E+3	4.1E+2
Indoor 24 SD	1.4E+3	1.9E+3	1.3E+3	7.1E+2	7.3E+2	1.2E+3	4.5E+2
24h mean In/Out	0.16	0.14	0.15	0.18	0.19	0.16	0.02
Highest 8h Outdoor	3.6E+4	3.7E+4	2.4E+4	1.2E+4	1.6E+4	2.5E+4	1.0E+4
Highest 8h Indoor	5.3E+3	5.3E+3	3.9E+3	2.4E+3	2.8E+3	3.9E+3	1.2E+3
Highest 8 h In/Out	0.15	0.14	0.16	0.19	0.18	0.16	0.02
Highest 1h Outdoor	3.6E+4	4.4E+4	3.2E+4	1.9E+4	1.9E+4	3.0E+4	9.9E+3
Highest 1 h Indoor ²	5.3E+3	5.3E+3	3.9E+3	2.4E+3	2.8E+3	4.6E+3	1.4E+3
Highest 1h In/Out	0.15	0.15	0.16	0.16	0.16	0.15	0.01
Time of highest 1h Outdoor	6/26/14 13:19	6/27/14 12:54	6/28/14 11:12	6/29/14 10:24	6/30/14 10:31		
Corresponding highest 1h Indoor	6/26/14 13:37	6/27/14 15:14	6/28/14 12:19	6/29/14 12:10	6/30/14 12:11		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/26/2014 20:00, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Table SU-4-G-3. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 100 nm to 2.5 micron measured using the TSI 3781 CPC with size selector.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Mean ¹	SD ¹
Outdoor 24h mean	9.6E+2	1.1E+3	1.4E+3	1.6E+3	1.6E+3	1.3E+3	2.5E+2
Outdoor 24 SD	6.0E+2	7.6E+2	8.7E+2	6.6E+2	5.1E+2	6.8E+2	1.3E+2
Indoor 24h mean	2.4E+2	2.5E+2	3.4E+2	4.1E+2	4.6E+2	3.4E+2	8.7E+1
Indoor 24 SD	1.1E+2	1.5E+2	2.2E+2	1.7E+2	1.4E+2	1.6E+2	3.4E+1
24h mean In/Out	0.22	0.23	0.23	0.26	0.28	0.24	0.02
Highest 8h Outdoor	1.7E+3	2.0E+3	2.4E+3	2.1E+3	2.3E+3	2.1E+3	2.5E+2
Highest 8h Indoor	3.7E+2	4.4E+2	5.8E+2	6.3E+2	6.3E+2	5.3E+2	1.1E+2
Highest 8 h In/Out	0.22	0.22	0.24	0.30	0.27	0.25	0.03
Highest 1h Outdoor	1.8E+3	2.6E+3	3.4E+3	3.2E+3	2.6E+3	2.7E+3	5.6E+2
Highest 1 h Indoor ²	3.7E+2	4.4E+2	5.8E+2	6.3E+2	6.3E+2	5.8E+2	1.7E+2
Highest 1h In/Out	0.25	0.18	0.24	0.24	0.17	0.22	0.03
Time of highest 1h Outdoor	6/26/14 15:12	6/27/14 16:54	6/28/14 13:15	6/29/14 23:37	6/30/14 19:23		
Corresponding highest 1h Indoor	6/26/14 16:01	6/27/14 16:54	6/28/14 14:22	6/30/14 0:42	6/30/14 20:37		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/26/2014 20:00, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Table SU-4-G-4. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 6–100 nm based on difference between concentrations measured using the TSI 3787 CPC and the TSI 3781 CPC with size selector.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Mean ¹	SD ¹
Outdoor 24h mean	1.7E+4	2.1E+4	1.3E+4	8.8E+3	1.0E+4	1.4E+4	4.5E+3
Outdoor 24 SD	8.0E+3	1.3E+4	7.3E+3	4.4E+3	4.5E+3	7.3E+3	3.0E+3
Indoor 24h mean	2.6E+3	2.8E+3	2.0E+3	1.6E+3	1.7E+3	2.1E+3	4.9E+2
Indoor 24 SD	1.3E+3	1.8E+3	1.2E+3	5.8E+2	6.1E+2	1.1E+3	4.5E+2
24h mean In/Out	0.15	0.14	0.14	0.17	0.18	0.16	0.01
Highest 8h Outdoor	3.5E+4	3.6E+4	2.2E+4	1.1E+4	1.4E+4	2.4E+4	1.0E+4
Highest 8h Indoor	5.1E+3	4.9E+3	3.4E+3	1.9E+3	2.3E+3	3.5E+3	1.3E+3
Highest 8 h In/Out	0.14	0.14	0.16	0.17	0.16	0.15	0.01
Highest 1h Outdoor	3.5E+4	4.2E+4	3.0E+4	1.8E+4	1.7E+4	2.9E+4	9.8E+3
Highest 1 h Indoor ²	5.1E+3	4.9E+3	3.4E+3	1.9E+3	2.3E+3	4.2E+3	1.4E+3
Highest 1h In/Out	0.14	0.14	0.15	0.14	0.15	0.15	0.00
Time of highest 1h Outdoor	6/26/14 13:20	6/27/14 12:55	6/28/14 11:11	6/29/14 10:24	6/30/14 10:30		
Corresponding highest 1h Indoor	6/26/14 13:36	6/27/14 15:14	6/28/14 12:15	6/29/14 11:15	6/30/14 11:18		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/26/2014 20:00, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Table SU-4-G-5. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 100–300 nm based on difference between concentrations measured using the TSI 3781 CPC with size selector and the MetOne BT637S OPC

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Mean ¹	SD ¹
Outdoor 24h mean	9.6E+5	1.1E+6	1.4E+6	1.6E+6	1.6E+6	1.3E+6	2.5E+5
Outdoor 24 SD	6.0E+5	7.7E+5	8.7E+5	6.6E+5	5.1E+5	6.8E+5	1.3E+5
Indoor 24h mean	2.4E+5	2.5E+5	3.3E+5	4.0E+5	4.6E+5	3.4E+5	8.6E+4
Indoor 24 SD	1.1E+5	1.5E+5	2.2E+5	1.7E+5	1.4E+5	1.6E+5	3.4E+4
24h mean In/Out	0.22	0.23	0.23	0.26	0.28	0.24	0.02
Highest 8h Outdoor	1.7E+6	2.0E+6	2.4E+6	2.1E+6	2.3E+6	2.1E+6	2.4E+5
Highest 8h Indoor	3.6E+5	4.4E+5	5.7E+5	6.2E+5	6.2E+5	5.2E+5	1.0E+5
Highest 8 h In/Out	0.22	0.22	0.24	0.30	0.27	0.25	0.03
Highest 1h Outdoor	1.8E+6	2.6E+6	3.4E+6	3.2E+6	2.6E+6	2.7E+6	5.5E+5
Highest 1 h Indoor ²	3.6E+5	4.4E+5	5.7E+5	6.2E+5	6.2E+5	5.8E+5	1.7E+5
Highest 1h In/Out	0.25	0.18	0.24	0.24	0.17	0.21	0.03
Time of highest 1h Outdoor	6/26/14 15:12	6/27/14 16:54	6/28/14 13:15	6/29/14 23:37	6/30/14 19:23		
Corresponding highest 1h Indoor	6/26/14 16:01	6/27/14 16:54	6/28/14 14:22	6/30/14 0:42	6/30/14 20:37		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/26/2014 20:00, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Table SU-4-G-6. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.3–0.4 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Mean ¹	SD ¹
Outdoor 24h mean	4.3E+3	5.8E+3	6.5E+3	9.9E+3	1.1E+4	7.5E+3	2.6E+3
Outdoor 24 SD	1.1E+3	3.9E+3	3.0E+3	6.4E+3	2.2E+3	3.3E+3	1.8E+3
Indoor 24h mean	1.4E+3	1.7E+3	2.0E+3	3.2E+3	4.0E+3	2.5E+3	1.0E+3
Indoor 24 SD	2.1E+2	6.9E+2	4.7E+2	1.8E+3	9.5E+2	8.3E+2	5.6E+2
24h mean In/Out	0.35	0.29	0.31	0.33	0.35	0.32	0.02
Highest 8h Outdoor	4.8E+3	9.2E+3	8.0E+3	1.5E+4	1.7E+4	1.1E+4	4.6E+3
Highest 8h Indoor	1.9E+3	2.5E+3	2.5E+3	6.2E+3	6.2E+3	3.9E+3	1.9E+3
Highest 8 h In/Out	0.41	0.27	0.31	0.41	0.36	0.35	0.06
Highest 1h Outdoor	6.5E+3	1.6E+4	1.0E+4	2.6E+4	1.5E+4	1.5E+4	6.6E+3
Highest 1 h Indoor ²	1.9E+3	2.5E+3	2.5E+3	6.2E+3	6.2E+3	4.8E+3	2.3E+3
Highest 1h In/Out	0.47	0.19	0.27	0.31	0.48	0.34	0.11
Time of highest 1h Outdoor	6/27/14 1:41	6/27/14 4:44	6/28/14 12:49	6/29/14 23:24	6/30/14 2:00		
Corresponding highest 1h Indoor	6/27/14 5:15	6/27/14 8:07	6/28/14 13:42	6/30/14 0:59	6/30/14 2:00		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/26/2014 20:00, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Table SU-4-G-7. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.4–0.5 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Mean ¹	SD ¹
Outdoor 24h mean	4.8E+2	7.7E+2	1.1E+3	1.8E+3	2.1E+3	1.2E+3	6.2E+2
Outdoor 24 SD	1.2E+2	6.1E+2	4.5E+2	1.3E+3	7.9E+2	6.6E+2	3.9E+2
Indoor 24h mean	1.6E+2	2.2E+2	3.1E+2	5.5E+2	6.9E+2	3.9E+2	2.0E+2
Indoor 24 SD	2.2E+1	8.5E+1	8.2E+1	3.1E+2	2.3E+2	1.5E+2	1.1E+2
24h mean In/Out	0.33	0.29	0.30	0.31	0.33	0.31	0.02
Highest 8h Outdoor	5.1E+2	1.1E+3	1.3E+3	2.7E+3	3.2E+3	1.8E+3	1.0E+3
Highest 8h Indoor	1.9E+2	3.0E+2	4.3E+2	1.1E+3	1.1E+3	6.1E+2	3.8E+2
Highest 8 h In/Out	0.38	0.26	0.34	0.39	0.33	0.34	0.05
Highest 1h Outdoor	6.2E+2	2.4E+3	1.6E+3	4.8E+3	3.1E+3	2.5E+3	1.4E+3
Highest 1 h Indoor ²	1.9E+2	3.0E+2	4.3E+2	1.1E+3	1.1E+3	7.0E+2	4.4E+2
Highest 1h In/Out	0.31	0.18	0.27	0.28	0.35	0.28	0.06
Time of highest 1h Outdoor	6/26/14 21:33	6/27/14 4:46	6/28/14 23:50	6/29/14 23:36	7/1/14 2:00		
Corresponding highest 1h Indoor	6/26/14 22:49	6/27/14 8:11	6/29/14 0:20	6/30/14 0:40	7/1/14 6:00		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/26/2014 20:00, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Table SU-4-G-8. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.5–0.7 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Mean ¹	SD ¹
Outdoor 24h mean	4.3E+2	4.1E+2	8.5E+2	1.6E+3	2.3E+3	1.1E+3	7.3E+2
Outdoor 24 SD	9.9E+1	2.3E+2	4.5E+2	1.0E+3	1.3E+3	6.2E+2	4.7E+2
Indoor 24h mean	1.1E+2	1.3E+2	2.2E+2	4.3E+2	5.8E+2	2.9E+2	1.8E+2
Indoor 24 SD	1.8E+1	7.0E+1	1.0E+2	2.2E+2	2.7E+2	1.3E+2	9.3E+1
24h mean In/Out	0.26	0.29	0.29	0.26	0.27	0.27	0.01
Highest 8h Outdoor	4.6E+2	5.5E+2	1.3E+3	2.1E+3	3.6E+3	1.6E+3	1.2E+3
Highest 8h Indoor	1.2E+2	1.9E+2	4.1E+2	7.4E+2	1.1E+3	5.1E+2	3.6E+2
Highest 8 h In/Out	0.25	0.35	0.32	0.35	0.30	0.31	0.04
Highest 1h Outdoor	5.4E+2	9.8E+2	1.8E+3	3.6E+3	4.4E+3	2.3E+3	1.5E+3
Highest 1 h Indoor ²	1.2E+2	1.9E+2	4.1E+2	7.4E+2	1.1E+3	6.1E+2	4.1E+2
Highest 1h In/Out	0.26	0.36	0.23	0.24	0.29	0.27	0.05
Time of highest 1h Outdoor	6/26/14 21:34	6/27/14 4:47	6/28/14 23:50	6/29/14 23:37	7/1/14 2:00		
Corresponding highest 1h Indoor	6/26/14 23:05	6/27/14 8:04	6/29/14 3:50	6/30/14 0:50	7/1/14 6:00		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/26/2014 20:00, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Table SU-4-G-9. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.7–1.0 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Mean ¹	SD ¹
Outdoor 24h mean	1.9E+2	1.2E+2	3.6E+2	7.0E+2	1.0E+3	4.8E+2	3.4E+2
Outdoor 24 SD	4.1E+1	4.7E+1	2.5E+2	4.3E+2	6.9E+2	2.9E+2	2.5E+2
Indoor 24h mean	3.7E+1	3.7E+1	7.4E+1	1.4E+2	1.9E+2	9.5E+1	6.0E+1
Indoor 24 SD	6.6E+0	3.3E+1	4.9E+1	7.5E+1	1.0E+2	5.3E+1	3.3E+1
24h mean In/Out	0.18	0.26	0.26	0.20	0.20	0.22	0.03
Highest 8h Outdoor	2.1E+2	1.9E+2	6.0E+2	1.1E+3	1.8E+3	7.8E+2	6.1E+2
Highest 8h Indoor	3.8E+1	3.8E+1	1.5E+2	2.1E+2	4.0E+2	1.7E+2	1.3E+2
Highest 8 h In/Out	0.18	0.20	0.25	0.19	0.22	0.21	0.02
Highest 1h Outdoor	2.3E+2	2.3E+2	8.0E+2	1.3E+3	2.3E+3	9.7E+2	7.8E+2
Highest 1 h Indoor ²	3.8E+1	3.8E+1	1.5E+2	2.1E+2	4.0E+2	2.1E+2	1.4E+2
Highest 1h In/Out	0.20	0.64	0.20	0.18	0.20	0.28	0.18
Time of highest 1h Outdoor	6/26/14 21:09	6/27/14 8:04	6/28/14 23:50	6/29/14 7:38	7/1/14 2:00		
Corresponding highest 1h Indoor	6/26/14 23:07	6/27/14 8:07	6/29/14 3:50	6/29/14 8:13	7/1/14 6:00		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/26/2014 20:00, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Table SU-4-G-10. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 1.0–2.5 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Mean ¹	SD ¹
Outdoor 24h mean	1.9E+2	1.2E+2	3.0E+2	5.2E+2	8.1E+2	3.9E+2	2.5E+2
Outdoor 24 SD	6.1E+1	3.8E+1	3.6E+2	2.8E+2	4.8E+2	2.4E+2	1.7E+2
Indoor 24h mean	2.1E+1	3.5E+1	5.2E+1	6.3E+1	8.7E+1	5.2E+1	2.3E+1
Indoor 24 SD	4.9E+0	5.9E+1	7.4E+1	3.1E+1	4.3E+1	4.2E+1	2.4E+1
24h mean In/Out	0.11	0.23	0.25	0.13	0.12	0.17	0.06
Highest 8h Outdoor	2.2E+2	1.8E+2	5.2E+2	7.6E+2	1.3E+3	6.0E+2	4.2E+2
Highest 8h Indoor	2.1E+1	2.1E+1	6.7E+1	9.2E+1	1.6E+2	7.2E+1	5.1E+1
Highest 8 h In/Out	0.10	0.12	0.13	0.12	0.12	0.12	0.01
Highest 1h Outdoor	2.3E+2	2.2E+2	7.0E+2	9.6E+2	1.6E+3	7.4E+2	5.1E+2
Highest 1 h Indoor ²	2.1E+1	2.1E+1	6.7E+1	9.2E+1	1.6E+2	1.2E+2	8.2E+1
Highest 1h In/Out	0.11	1.11	0.07	0.11	0.11	0.30	0.41
Time of highest 1h Outdoor	6/26/14 17:59	6/27/14 8:05	6/28/14 19:14	6/29/14 8:37	7/1/14 2:00		
Corresponding highest 1h Indoor	6/26/14 21:54	6/27/14 8:05	6/28/14 23:14	6/29/14 8:56	7/1/14 5:45		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/26/2014 20:00, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Table SU-4-G-11. Summary statistics for estimated PM_{2.5} concentrations (µg m⁻³) calculated from particle number concentrations resolved by size from 6 nm to 2.5 microns (as reported in Tables SU-4-G-2 to SU-4-9) and resulting indoor/outdoor ratios.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Mean ¹	SD ¹
Outdoor 24h mean	7.7E+0	8.4E+0	9.8E+0	1.2E+1	1.4E+1	1.0E+1	2.4E+0
Outdoor 24 SD	3.4E+0	4.3E+0	4.4E+0	4.5E+0	4.2E+0	4.1E+0	3.9E-1
Indoor 24h mean	1.5E+0	1.7E+0	2.1E+0	2.6E+0	3.0E+0	2.2E+0	5.5E-1
Indoor 24 SD	5.8E-1	8.2E-1	9.7E-1	9.3E-1	7.6E-1	8.1E-1	1.4E-1
24h mean In/Out	0.19	0.20	0.21	0.21	0.23	0.21	0.01
Highest 8h Outdoor	1.2E+1	1.3E+1	1.4E+1	1.4E+1	1.7E+1	1.4E+1	1.8E+0
Highest 8h Indoor	2.3E+0	2.5E+0	3.0E+0	3.9E+0	3.9E+0	3.1E+0	6.8E-1
Highest 8 h In/Out	0.19	0.19	0.22	0.27	0.23	0.22	0.03
Highest 1h Outdoor	1.2E+1	1.5E+1	1.8E+1	2.2E+1	2.3E+1	1.8E+1	4.1E+0
Highest 1 h Indoor ²	2.3E+0	2.5E+0	3.0E+0	3.9E+0	3.9E+0	3.5E+0	7.4E-1
Highest 1h In/Out	0.21	0.20	0.23	0.21	0.13	0.19	0.03
Time of highest 1h Outdoor	6/26/14 14:46	6/27/14 12:51	6/28/14 12:43	6/29/14 23:36	6/30/14 19:27		
Corresponding highest 1h Indoor	6/26/14 16:00	6/27/14 15:14	6/28/14 14:16	6/30/14 0:41	6/30/14 20:43		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/26/2014 20:00, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Table SU-4-G-12. Summary statistics for concentrations of PM_{2.5} (µg m⁻³) and indoor /outdoor ratios from measurements reported by TSI DustTrak II.

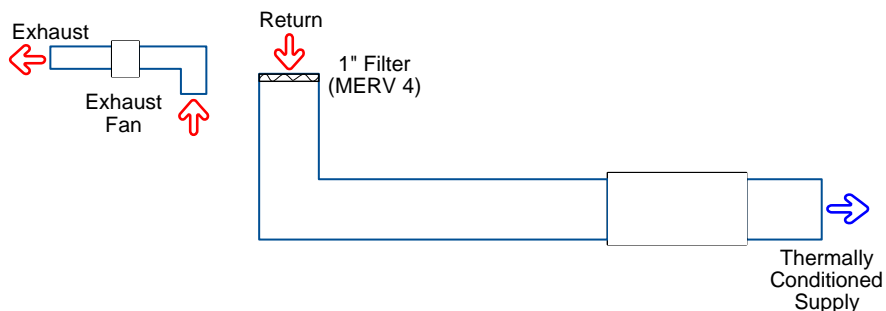
Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Mean ¹	SD ¹
Outdoor 24h mean	2.9E-3	3.0E-3	3.3E-3	9.2E-3	1.2E-2	6.2E-3	3.9E-3
Outdoor 24 SD	1.3E-3	1.9E-3	4.9E-3	5.9E-3	3.8E-3	3.6E-3	1.7E-3
Indoor 24h mean	1.2E-3	1.4E-3	2.4E-3	2.3E-3	3.2E-3	2.1E-3	7.1E-4
Indoor 24 SD	3.8E-4	5.6E-4	7.7E-3	1.3E-3	1.4E-3	2.3E-3	2.7E-3
24h mean In/Out	0.45	0.41	0.67	0.43	0.27	0.45	0.13
Highest 8h Outdoor	3.8E-3	4.2E-3	4.8E-3	1.3E-2	1.5E-2	8.1E-3	4.8E-3
Highest 8h Indoor	1.9E-3	1.9E-3	4.1E-3	3.8E-3	3.9E-3	3.1E-3	1.0E-3
Highest 8 h In/Out	0.49	0.44	0.85	0.31	0.26	0.47	0.21
Highest 1h Outdoor	4.1E-3	6.0E-3	8.5E-3	2.1E-2	1.5E-2	1.1E-2	6.3E-3
Highest 1 h Indoor ²	1.9E-3	1.9E-3	4.1E-3	3.8E-3	3.9E-3	6.7E-3	6.5E-3
Highest 1h In/Out	0.46	0.43	2.29	0.25	0.27	0.74	0.78
Time of highest 1h Outdoor	6/26/14 15:00	6/27/14 4:44	6/28/14 19:01	6/29/14 23:25	6/30/14 19:48		
Corresponding highest 1h Indoor	6/26/14 15:00	6/27/14 8:03	6/28/14 19:01	6/30/14 0:46	6/30/14 19:57		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/26/2014 20:00, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Table SU-4-G-13. Daily¹ summary statistics for concentrations (nanograms m⁻³) and indoor /outdoor ratios of aerosol black carbon measured using the Aethalometer AE22.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Mean ¹	SD ¹
Outdoor 24h mean	1.4E+2	2.3E+2	1.9E+2	3.2E+2	5.1E+2	2.8E+2	1.3E+2
Outdoor 24 SD	3.8E+1	1.7E+2	9.5E+1	2.7E+2	3.5E+2	1.8E+2	1.1E+2
Indoor 24h mean	5.1E+1	7.4E+1	6.5E+1	1.0E+2	1.9E+2	9.6E+1	4.8E+1
Indoor 24 SD	1.8E+1	3.6E+1	2.8E+1	6.3E+1	1.0E+2	5.0E+1	3.1E+1
24h mean In/Out	0.41	0.32	0.35	0.35	0.34	0.35	0.03
Highest 8h Outdoor	1.6E+2	3.6E+2	2.4E+2	5.2E+2	9.2E+2	4.4E+2	2.7E+2
Highest 8h Indoor	8.0E+1	1.1E+2	9.5E+1	2.4E+2	3.1E+2	1.7E+2	9.2E+1
Highest 8 h In/Out	0.50	0.31	0.39	0.47	0.34	0.40	0.07
Highest 1h Outdoor	1.8E+2	6.5E+2	4.2E+2	9.7E+2	1.4E+3	7.3E+2	4.3E+2
Highest 1 h Indoor ²	8.0E+1	1.1E+2	9.5E+1	2.4E+2	3.1E+2	2.0E+2	1.2E+2
Highest 1h In/Out	0.31	0.20	0.34	0.30	0.27	0.28	0.05
Time of highest 1h Outdoor	6/26/14 22:06	6/27/14 4:42	6/29/14 2:00	6/29/14 23:09	6/30/14 7:42		
Corresponding highest 1h Indoor	6/26/14 23:39	6/27/14 8:24	6/29/14 3:21	6/30/14 3:09	6/30/14 8:12		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 6/26/2014 20:00, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Appendix SU-5-R. Results for Reference System, July 2-9, 2014.**Table SU-5-R-1.** Description of **Reference System** component characteristics during the period of **July 2-9, 2014**

System Parameter	Description or Measured Value
Heating	75,000 BTU/h, 80% eff., gas furnace, 1-stage burner
Cooling	3 ton, SEER13 air conditioner
Thermal distribution	Central fan with PSC motor: 1200 cfm for cooling, 1074 cfm for heating
Ventilation	Exhaust fan in main bathroom with ECM; Set to 38 cfm continuous
Filtration	MERV4, 1" (Purolator F312) filter installed at return air ceiling grill of forced air furnace. Some particle removal as air infiltrates through building envelope to replace air exiting home through continuous exhaust fan in bathroom.
Recirculation blower schedule	As required for thermal conditioning, no fan cyclers.
VOC removal system	None

Notes about this monitoring period

There were no major instrument problems for this operational period. We did have FAU power signal problems. It indicated the FAU was not running properly but it definitely was.

The 24 h running statistics in the figures starts at 7/3/2014 03:00.

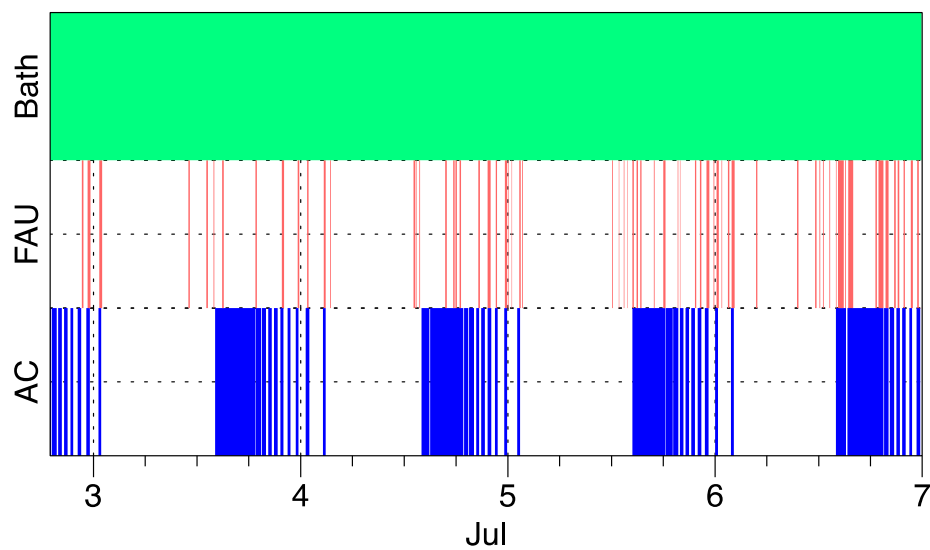


Figure SU-5-R-1. Operation of mechanical systems: Bath exhaust fan; fan on central forced air unit (FAU); central air-conditioning (AC).

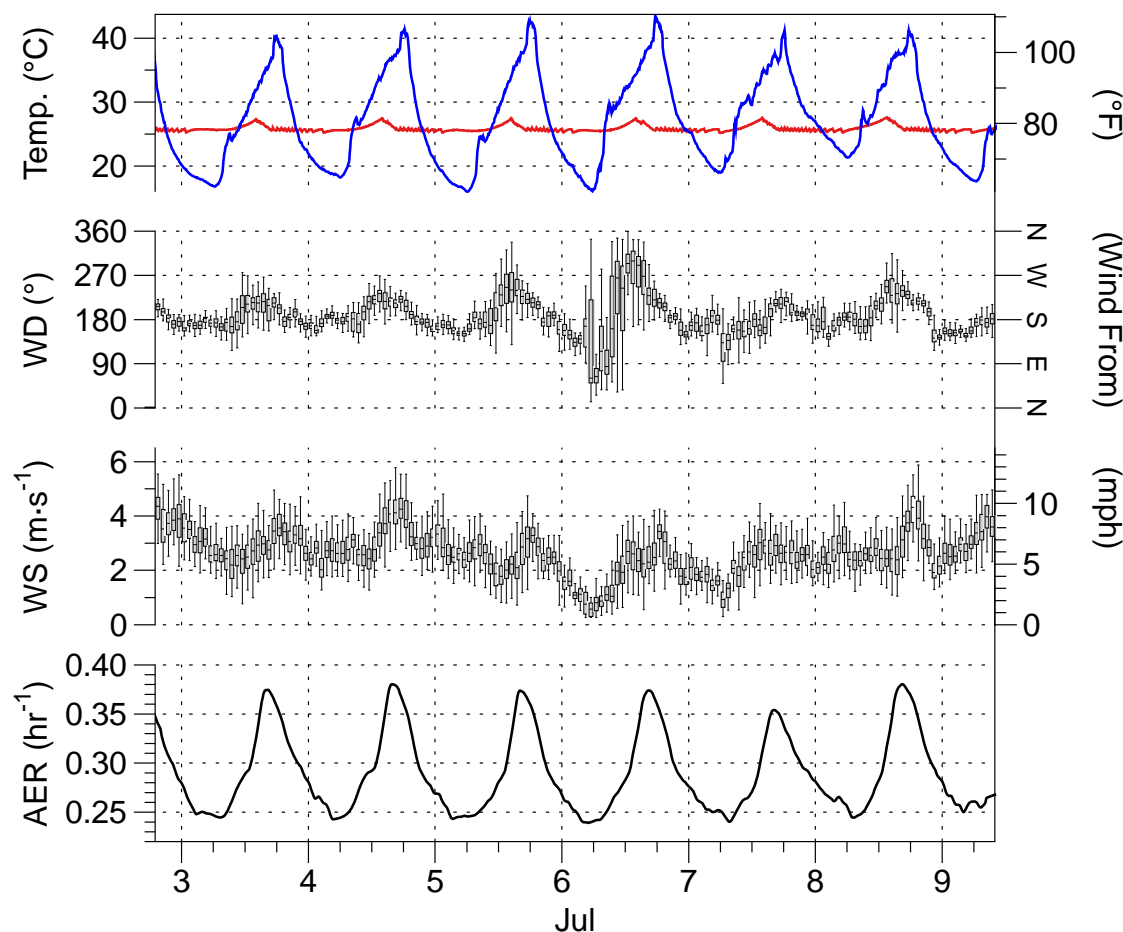


Figure SU-5-R-2. Environmental parameters measured during operation of Reference System, July 2-9, 2014. From top to bottom: indoor (red) and outdoor (blue) temperatures, wind direction (WD) in units of degrees from North, wind speed (WS), and air exchange rate (AER). For WD and WS, the box for each hour shows the 25th, 50th and 75th percentiles of the measured values and whiskers extend 1.5X the interquartile range (75th–25th percentile values) above the 75th and below the 25th percentile values.

Guide to plots of pollutant concentration time series and indoor / outdoor (I/O) ratios

The bottom section of each plot shows outdoor and indoor time series using the resolution of data collection: 3-min for black carbon and 1-min for all other parameters. The top and bottom of grey band are LOESS-smoothed, 1-min (or 3-min for black carbon) time-series. Also shown are time series with 1h and 24h time averaging for most pollutants and 1h and 8h average for ozone. Triangles in bottom of plot indicate the highest 1h outdoor and corresponding highest 1h indoor average during each day. The top section of each plot shows the ratio of indoor to outdoor running 24h mean values (8h for ozone) and the ratios of highest 1h indoor to corresponding highest 1h outdoor concentration each day.

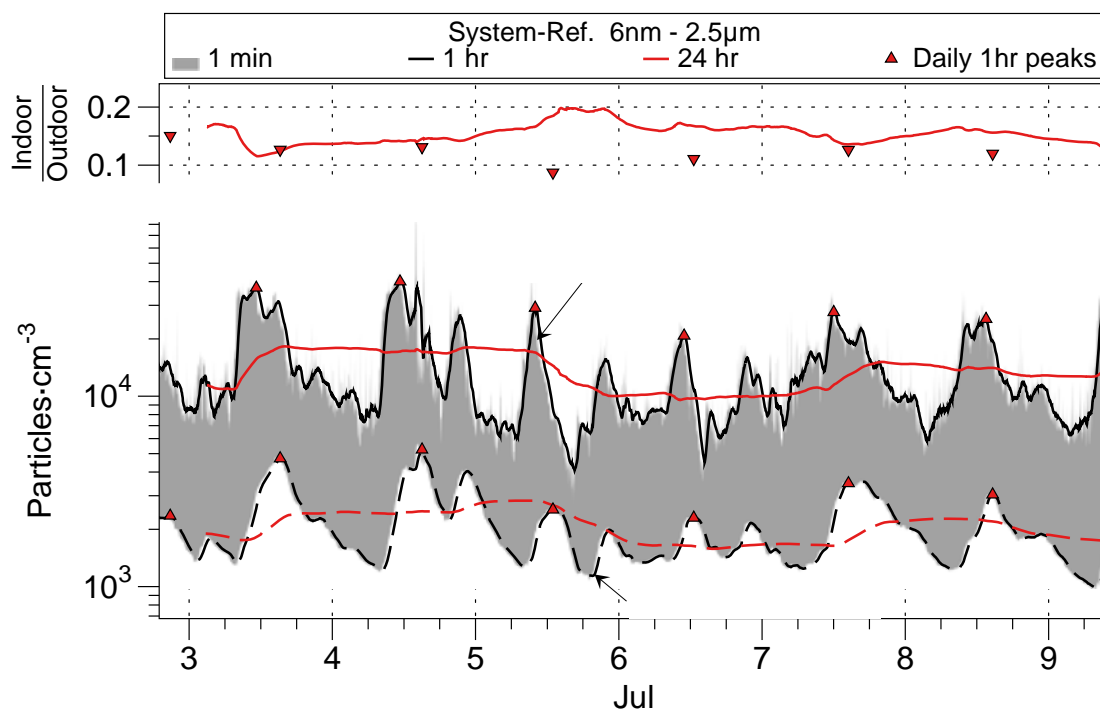


Figure SU-5-R-3. Number concentrations of 6 nm to 2.5 μm diameter particles measured outdoors and indoors during operation of Reference System, July 2-9, 2014. Data collected using TSI 3787 CPCs. Refer to “Guide” before Figure SU-5-R-3.

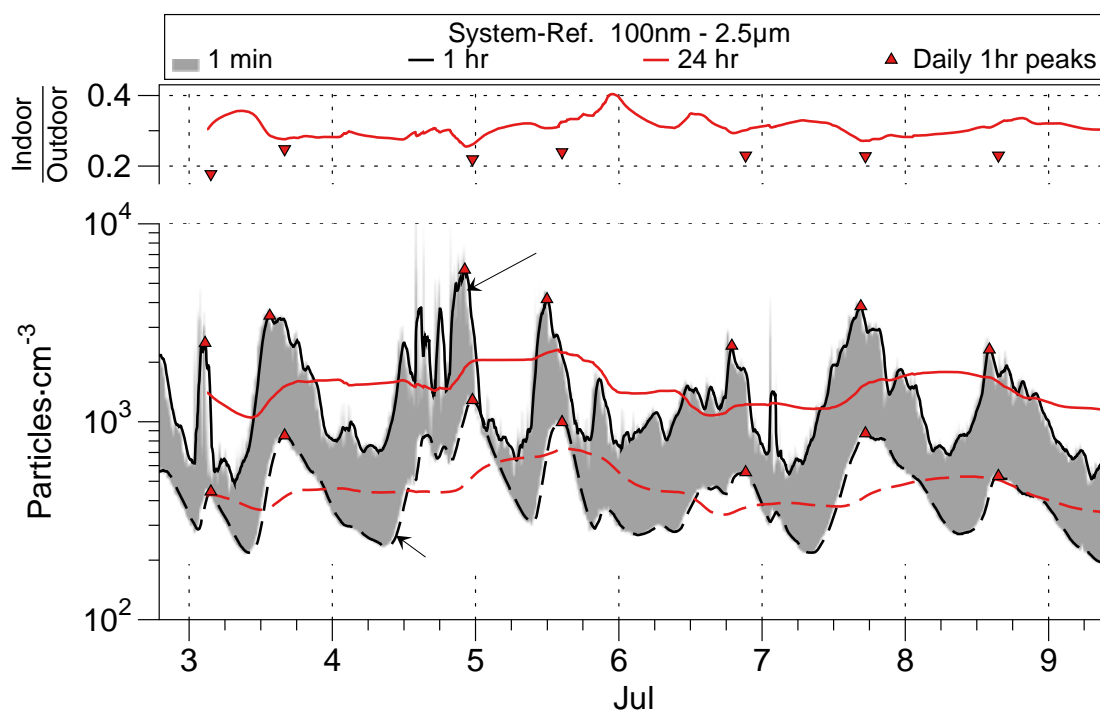


Figure SU-5-R-4. Number concentrations of 100 nm to 2.5 μm diameter particles measured outdoors and indoors during operation of Reference System, July 2-9, 2014. Data collected using TSI 3781 CPCs outfitted with screens to exclude particles smaller than 100 nm. Refer to “Guide” before Figure SU-5-R-3.

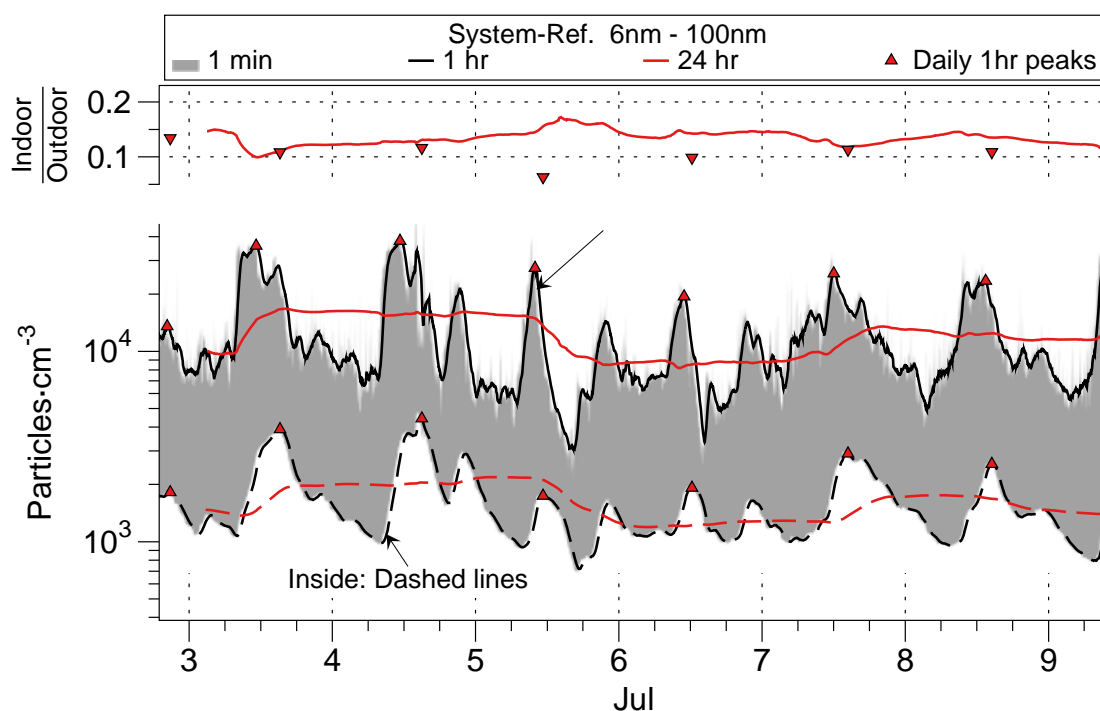


Figure SU-5-R-5. Number concentrations of 6–100 nm diameter particles measured outdoors and indoors during operation of Reference System, July 2-9, 2014. Data obtained as the difference between time series show in prior two figures. Refer to “Guide” before Figure SU-5-R-3.

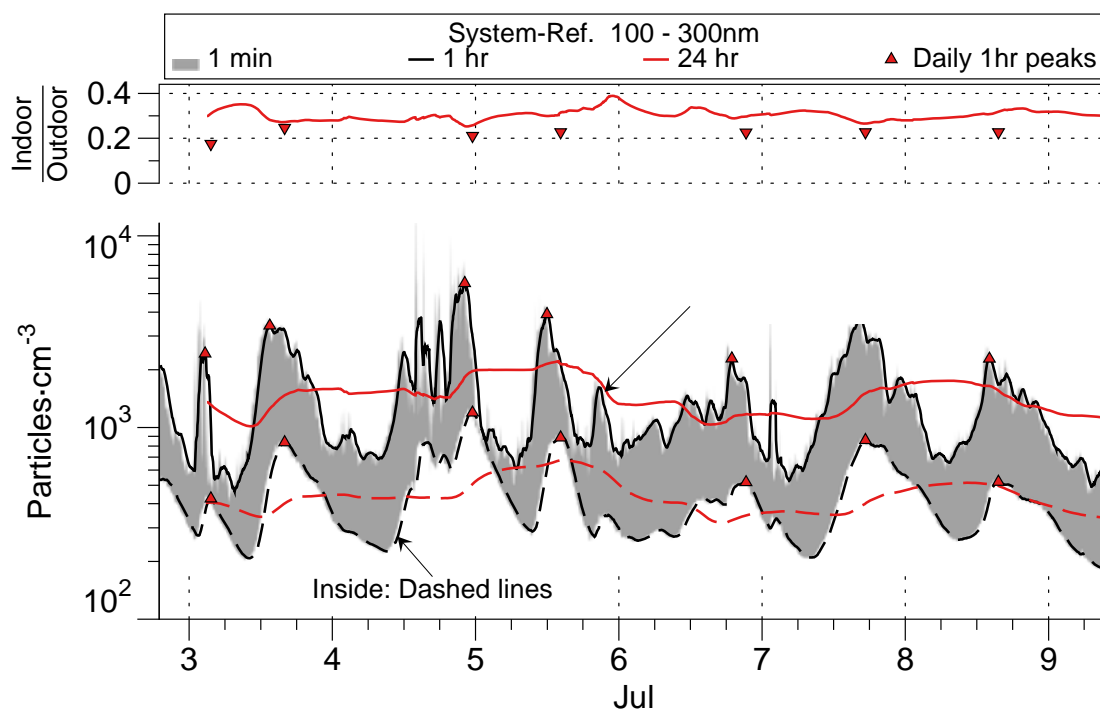


Figure SU-5-R-6. Number concentrations of 100–300 nm diameter particles measured outdoors and indoors during operation of Reference System, July 2-9, 2014. Data obtained as the difference between the TSI 3781 CPC with size selector and the MetOne BT637S OPC. Refer to “Guide” before Figure SU-5-R-3.

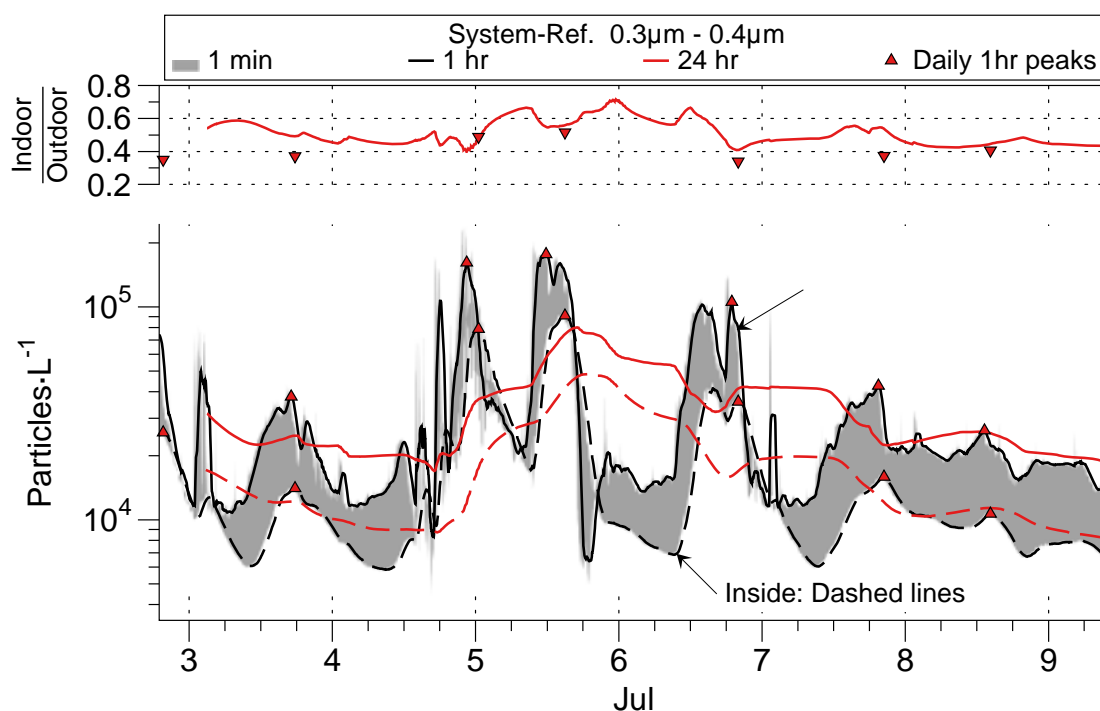


Figure SU-5-R-7. Number concentrations of 0.3–0.4 μm diameter particles measured outdoors and indoors during operation of Reference System, July 2-9, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-5-R-3.

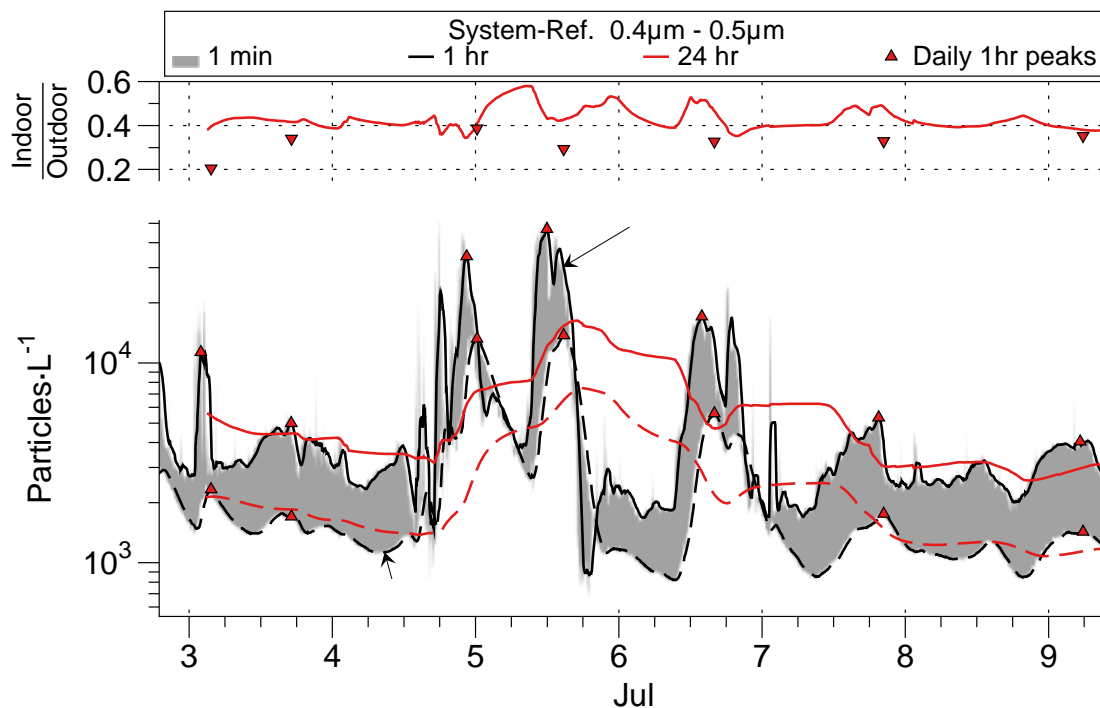


Figure SU-5-R-8. Number concentrations of 0.4–0.5 μm diameter particles measured outdoors and indoors during operation of Reference System, July 2-9, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-5-R-3.

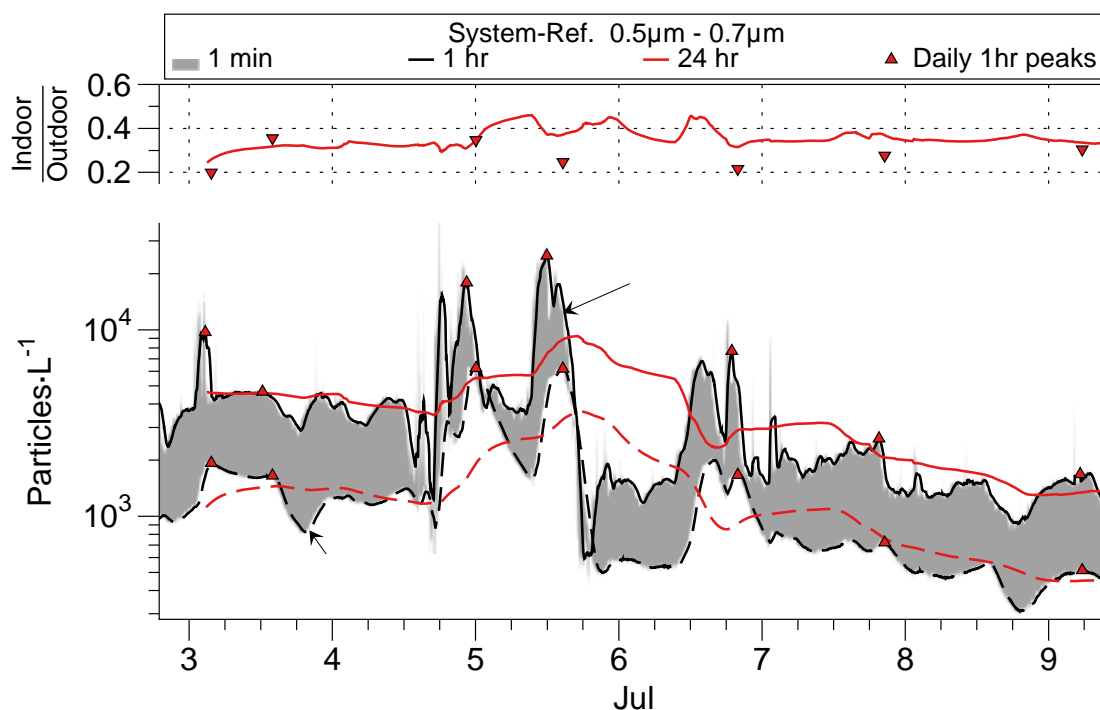


Figure SU-5-R-9. Number concentrations of 0.5–0.7 μm diameter particles measured outdoors and indoors during operation of Reference System, July 2-9, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-5-R-3.

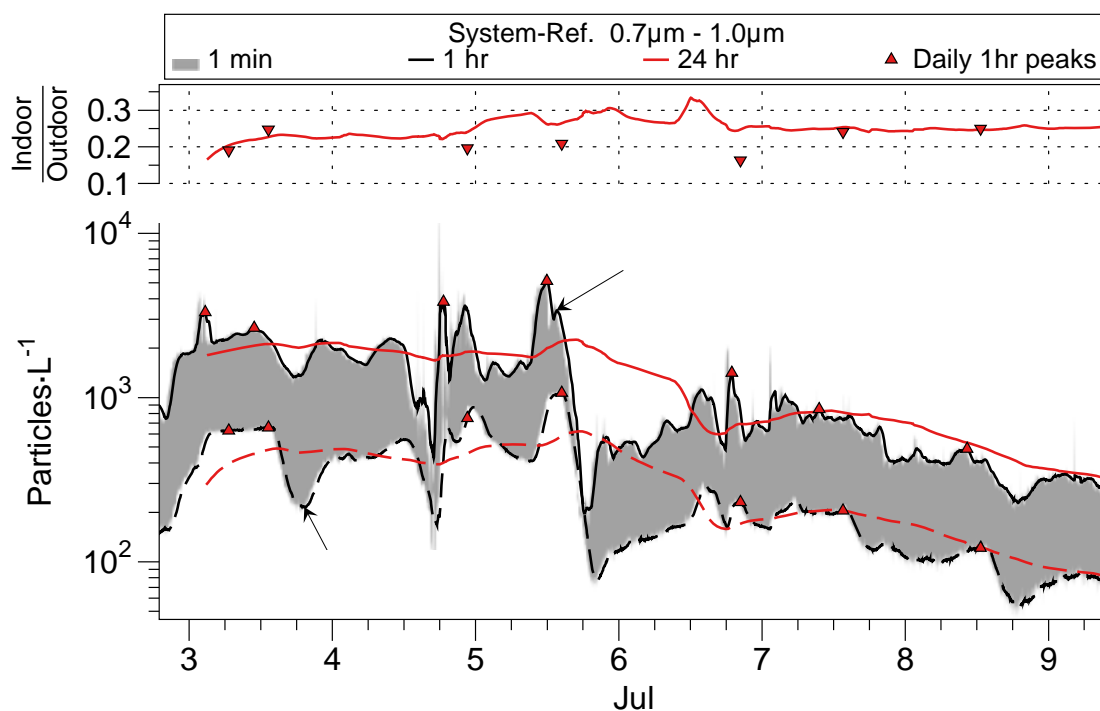


Figure SU-5-R-10. Number concentrations of 0.7–1.0 μm diameter particles measured outdoors and indoors during operation of Reference System, July 2-9, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-5-R-3.

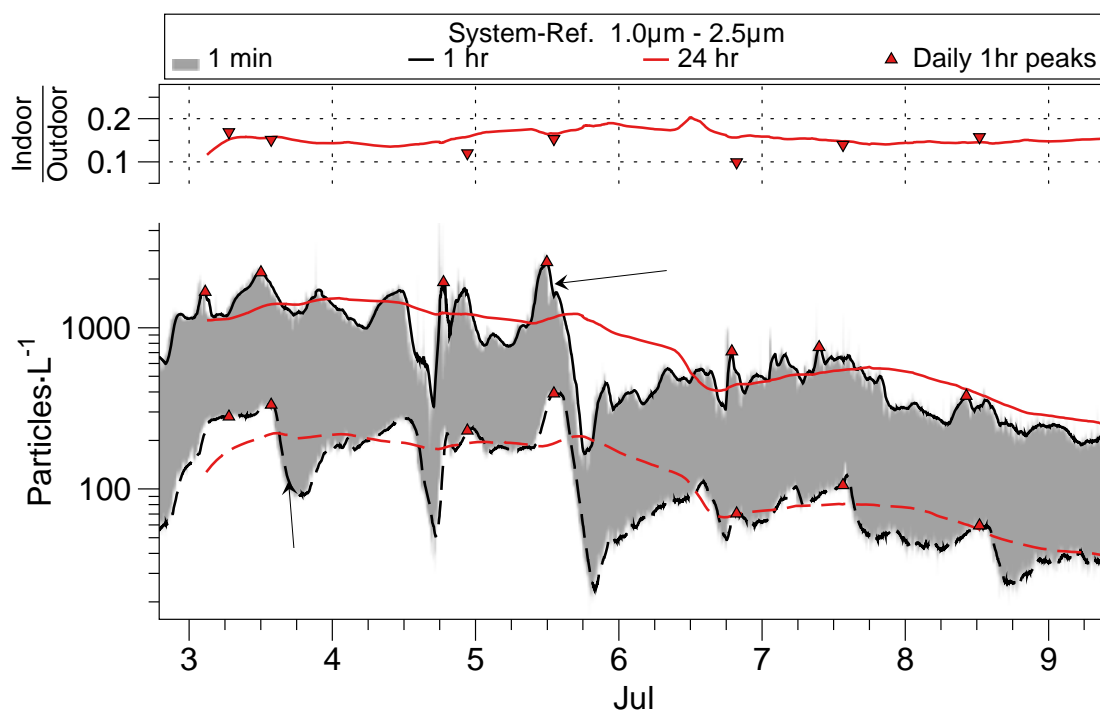


Figure SU-5-R-11. Number concentrations of 1.0–2.5 μm diameter particles measured outdoors and indoors during operation of Reference System, July 2-9, 2014. Data collected using MetOne BT637S particle counters. Refer to Figure SU-5-R-3 for details.

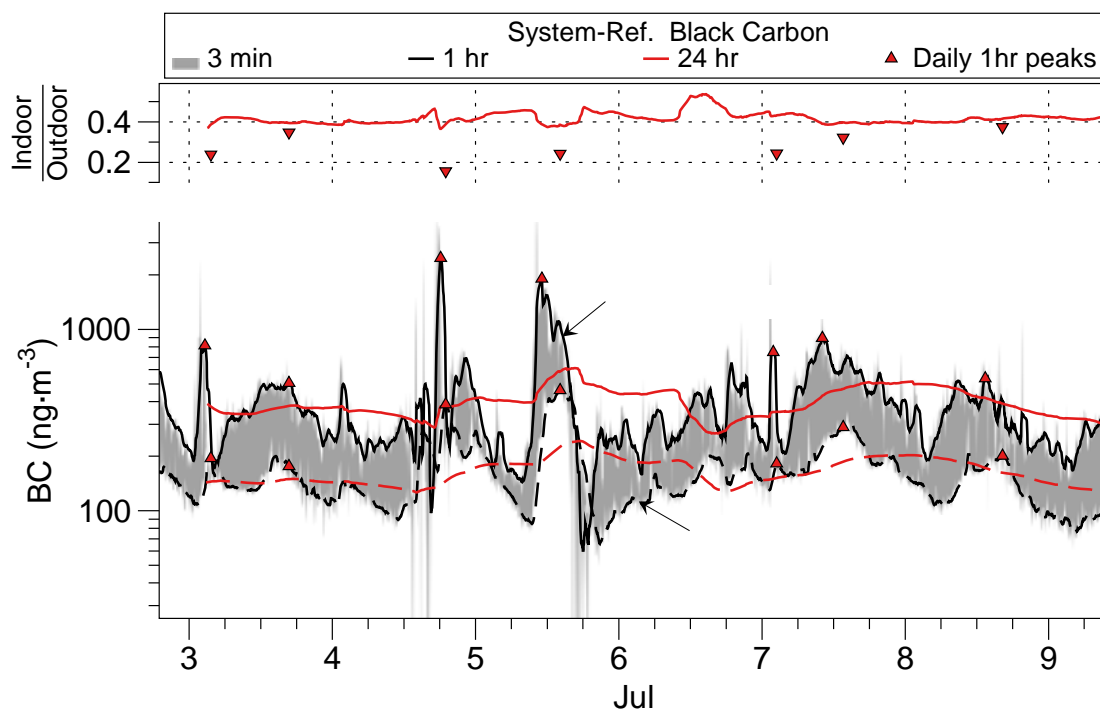


Figure SU-5-R-12. Black carbon concentrations measured outdoors and indoors during operation of Reference System, July 2-9, 2014. Data collected using AE22 Aethalometers with 3-min samples. Data otherwise as described in Figure SU-5-R-3 caption.

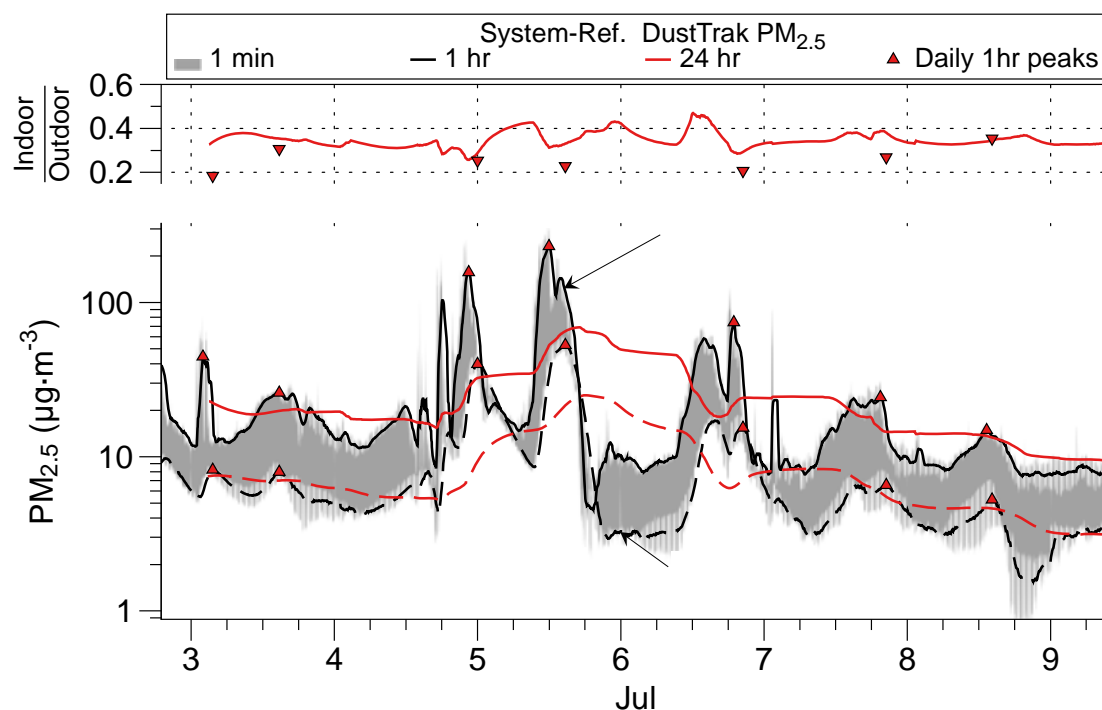


Figure SU-5-R-13. PM_{2.5} reported by TSI DustTrak II 8530 measurements outdoors and indoors during operation of Reference System, July 2-9, 2014. The DustTrak measures light scattering and uses a calibration to estimate PM_{2.5} mass. Refer to “Guide” before Figure SU-5-R-3.

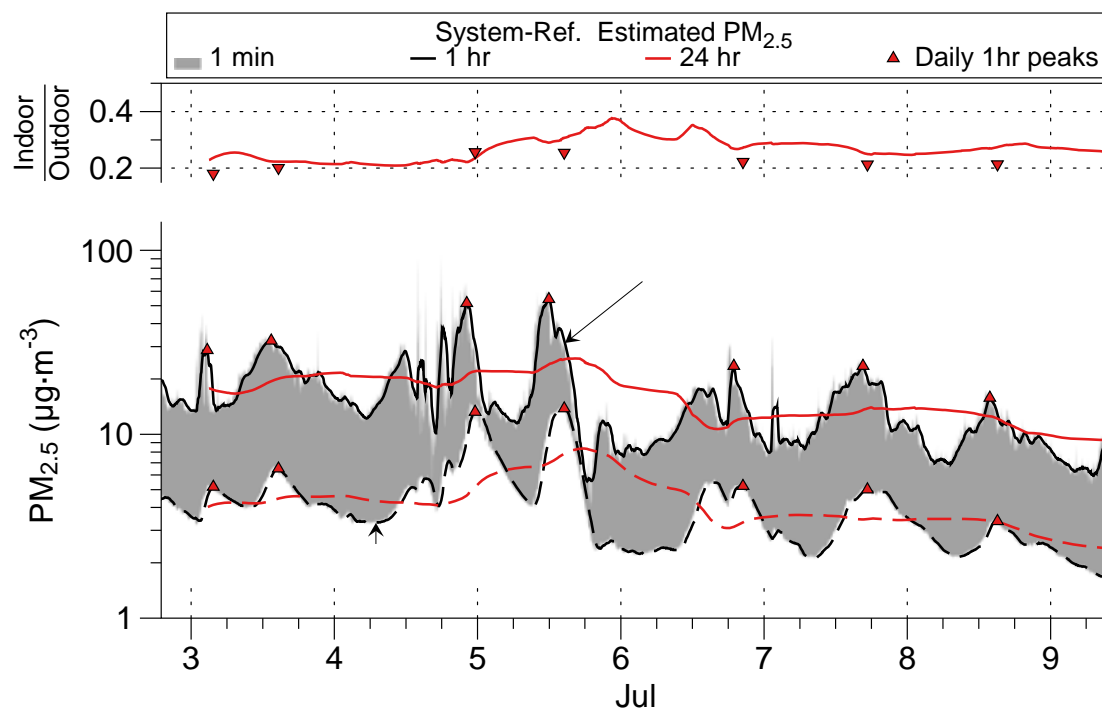


Figure SU-5-R-14. Estimated PM_{2.5} concentration calculated from size-resolved particle number concentrations measured by MetOne and CPC during operation of Reference System, July 2-9, 2014. Details provided in body of report. Refer to “Guide” before Figure SU-5-R-3.

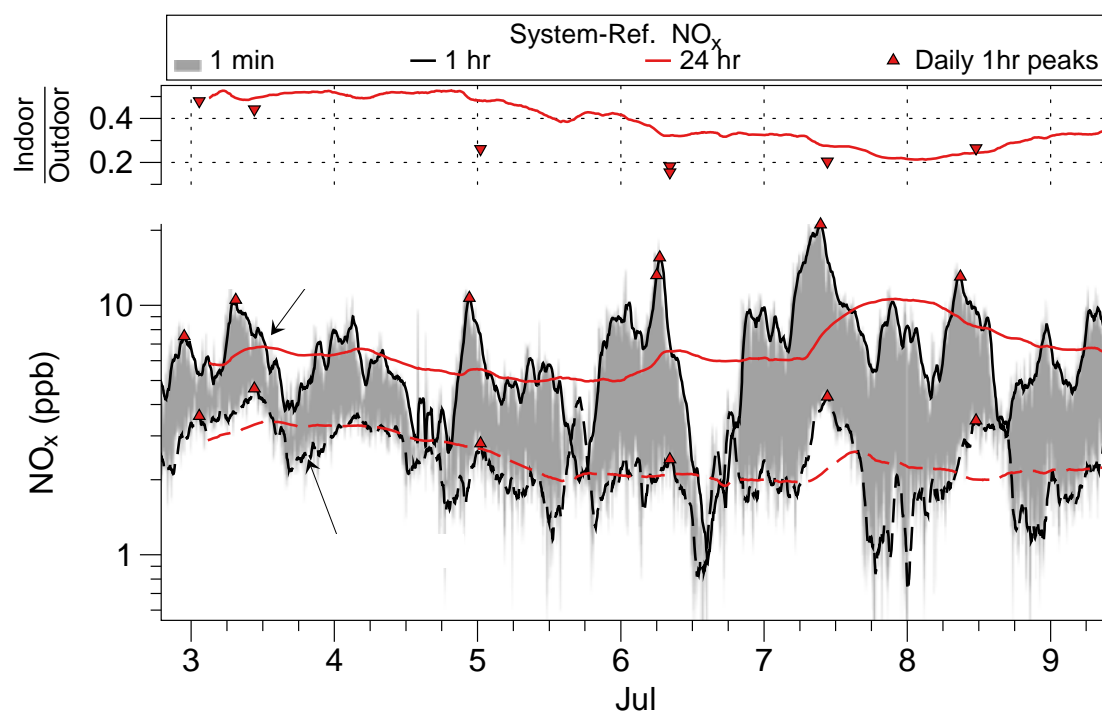


Figure SU-5-R-15. Nitrogen oxides concentrations measured outdoors and indoors during operation of Reference System, July 2-9, 2014. Data collected using API 200A and 200E chemiluminescence analyzers.

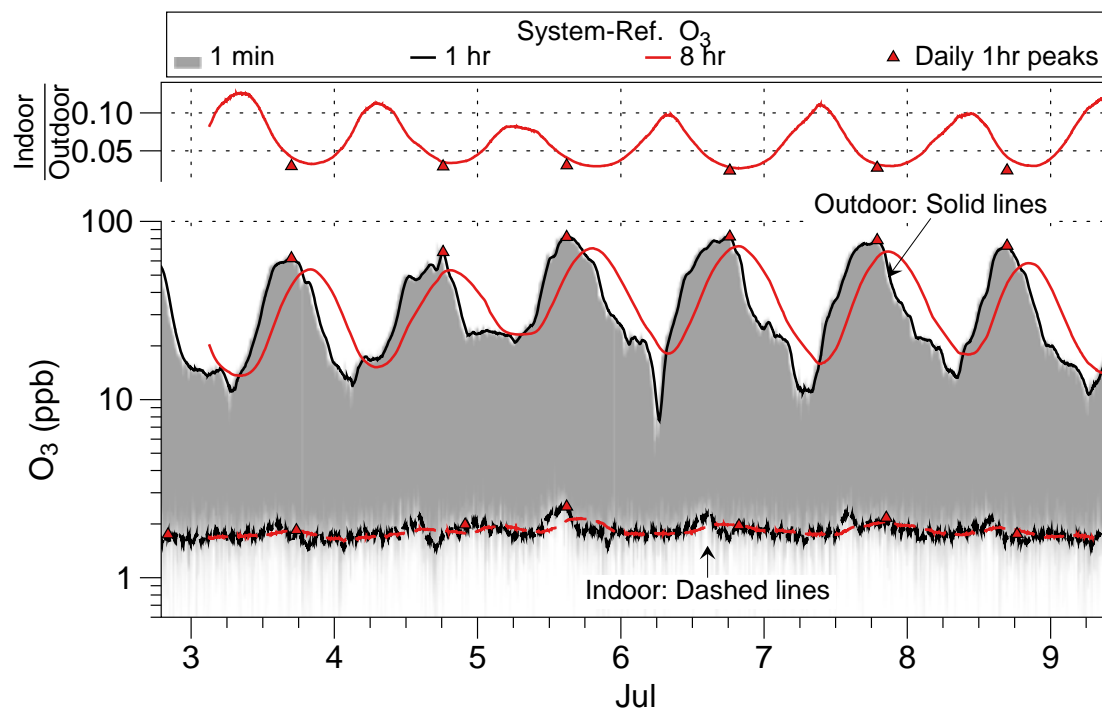


Figure SU-5-R-16. Ozone concentrations measured outdoors and indoors during operation of Reference System, July 2-9, 2014. Data collected using 2B Technologies Model 202 analyzers.

Table SU-5-R-2. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 6 nm to 2.5 micron measured using the TSI 3787 CPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	1.1E+4	1.8E+4	1.8E+4	1.0E+4	1.0E+4	1.4E+4	1.3E+4	1.3E+4	3.0E+3
Outdoor 24 SD	2.9E+3	9.8E+3	1.2E+4	5.8E+3	4.2E+3	5.9E+3	6.0E+3	6.6E+3	2.9E+3
Indoor 24h mean	1.8E+3	2.4E+3	2.8E+3	1.6E+3	1.7E+3	2.3E+3	1.8E+3	2.1E+3	4.2E+2
Indoor 24 SD	3.2E+2	1.0E+3	1.1E+3	4.3E+2	3.1E+2	7.8E+2	5.2E+2	6.5E+2	3.1E+2
24h mean In/Out	0.17	0.13	0.15	0.18	0.16	0.15	0.15	0.16	0.01
Highest 8h Outdoor	1.6E+4	3.1E+4	2.9E+4	1.4E+4	1.2E+4	2.1E+4	2.0E+4	2.0E+4	6.7E+3
Highest 8h Indoor	2.3E+3	3.7E+3	3.9E+3	2.1E+3	1.9E+3	3.2E+3	2.3E+3	2.8E+3	7.6E+2
Highest 8 h In/Out	0.15	0.12	0.13	0.15	0.15	0.16	0.12	0.14	0.01
Highest 1h Outdoor	1.6E+4	3.7E+4	4.0E+4	2.9E+4	2.1E+4	2.8E+4	2.5E+4	2.8E+4	7.9E+3
Highest 1 h Indoor ²	2.3E+3	3.7E+3	3.9E+3	2.1E+3	1.9E+3	3.2E+3	2.3E+3	3.4E+3	1.1E+3
Highest 1h In/Out	0.15	0.13	0.13	0.09	0.11	0.13	0.12	0.12	0.02
Time of highest 1h Outdoor	7/2/14 18:27	7/3/14 11:15	7/4/14 11:21	7/5/14 9:59	7/6/14 10:57	7/7/14 12:02	7/8/14 13:32		
Corresponding highest 1h Indoor	7/2/14 20:49	7/3/14 15:15	7/4/14 15:01	7/5/14 12:57	7/6/14 12:34	7/7/14 14:28	7/8/14 14:38		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 7/3/2014 03:00, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-5-R-3. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 100 nm to 2.5 micron measured using the TSI 3781 CPC with size selector.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Mean ¹	SD ¹
Outdoor 24h mean	1.2E+3	1.5E+3	2.1E+3	1.4E+3	1.2E+3	1.8E+3	1.2E+3	6.1E+2	1.4E+3	4.1E+2
Outdoor 24 SD	7.8E+2	9.7E+2	1.7E+3	9.3E+2	5.1E+2	9.1E+2	4.8E+2	9.8E+1	8.0E+2	4.5E+2
Indoor 24h mean	4.1E+2	4.4E+2	6.5E+2	4.5E+2	3.9E+2	5.2E+2	3.6E+2	7.3E+2	4.9E+2	1.2E+2
Indoor 24 SD	9.1E+1	2.0E+2	3.0E+2	2.3E+2	9.5E+1	2.1E+2	9.6E+1	2.5E+3	4.7E+2	7.8E+2
24h mean In/Out	0.33	0.30	0.29	0.34	0.32	0.30	0.31	0.31	0.31	0.02
Highest 8h Outdoor	2.4E+3	2.8E+3	3.4E+3	2.4E+3	1.6E+3	2.9E+3	1.7E+3	8.1E+2	2.2E+3	7.8E+2
Highest 8h Indoor	5.6E+2	7.0E+2	9.5E+2	7.2E+2	4.9E+2	7.7E+2	4.8E+2	3.0E+2	6.2E+2	1.9E+2
Highest 8 h In/Out	0.24	0.25	0.28	0.31	0.31	0.27	0.27	0.37	0.29	0.04
Highest 1h Outdoor	2.5E+3	3.4E+3	5.9E+3	4.2E+3	2.4E+3	3.8E+3	2.3E+3	7.3E+2	3.2E+3	1.4E+3
Highest 1 h Indoor ²	5.6E+2	7.0E+2	9.5E+2	7.2E+2	4.9E+2	7.7E+2	4.8E+2	3.0E+2	1.0E+3	6.1E+2
Highest 1h In/Out	0.18	0.25	0.22	0.24	0.23	0.23	0.23	3.35	0.62	1.04
Time of highest 1h Outdoor	7/3/14 2:41	7/3/14 13:31	7/4/14 22:10	7/5/14 11:58	7/6/14 18:56	7/7/14 16:34	7/8/14 14:07	7/9/14 10:04		
Corresponding highest 1h Indoor	7/3/14 3:39	7/3/14 16:00	7/4/14 23:30	7/5/14 14:29	7/6/14 21:16	7/7/14 17:19	7/8/14 15:37	7/9/14 10:12		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 7/3/2014 03:00, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-5-R-4. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 6–100 nm based on difference between concentrations measured using the TSI 3787 CPC and the TSI 3781 CPC with size selector.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	9.7E+3	1.6E+4	1.5E+4	8.9E+3	9.2E+3	1.3E+4	1.2E+4	1.2E+4	2.7E+3
Outdoor 24 SD	2.5E+3	9.5E+3	1.1E+4	5.6E+3	4.1E+3	5.4E+3	5.8E+3	6.3E+3	2.8E+3
Indoor 24h mean	1.4E+3	2.0E+3	2.2E+3	1.2E+3	1.3E+3	1.8E+3	1.4E+3	1.6E+3	3.5E+2
Indoor 24 SD	2.4E+2	8.8E+2	1.0E+3	3.0E+2	2.8E+2	6.2E+2	4.5E+2	5.4E+2	2.8E+2
24h mean In/Out	0.15	0.12	0.13	0.15	0.14	0.13	0.13	0.14	0.01
Highest 8h Outdoor	1.3E+4	2.8E+4	2.8E+4	1.2E+4	1.1E+4	1.8E+4	1.8E+4	1.8E+4	6.5E+3
Highest 8h Indoor	1.8E+3	3.1E+3	3.3E+3	1.4E+3	1.5E+3	2.5E+3	1.9E+3	2.2E+3	7.1E+2
Highest 8 h In/Out	0.13	0.11	0.12	0.12	0.13	0.14	0.10	0.12	0.01
Highest 1h Outdoor	1.4E+4	3.6E+4	3.8E+4	2.7E+4	1.9E+4	2.6E+4	2.3E+4	2.6E+4	8.0E+3
Highest 1 h Indoor ²	1.8E+3	3.1E+3	3.3E+3	1.4E+3	1.5E+3	2.5E+3	1.9E+3	2.8E+3	9.9E+2
Highest 1h In/Out	0.13	0.11	0.12	0.06	0.10	0.11	0.11	0.11	0.02
Time of highest 1h Outdoor	7/2/14 20:19	7/3/14 11:14	7/4/14 11:20	7/5/14 9:58	7/6/14 10:56	7/7/14 12:02	7/8/14 13:29		
Corresponding highest 1h Indoor	7/2/14 20:50	7/3/14 15:14	7/4/14 14:59	7/5/14 11:18	7/6/14 12:15	7/7/14 14:25	7/8/14 14:30		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 7/3/2014 03:00, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-5-R-5. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 100–300 nm based on difference between concentrations measured using the TSI 3781 CPC with size selector and the MetOne BT637S OPC

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	1.2E+6	1.5E+6	2.0E+6	1.3E+6	1.1E+6	1.7E+6	1.2E+6	1.4E+6	3.1E+5
Outdoor 24 SD	7.6E+5	9.7E+5	1.7E+6	8.6E+5	4.8E+5	9.1E+5	4.8E+5	8.8E+5	3.8E+5
Indoor 24h mean	3.9E+5	4.3E+5	6.1E+5	4.1E+5	3.6E+5	5.1E+5	3.5E+5	4.4E+5	8.6E+4
Indoor 24 SD	8.5E+4	2.0E+5	2.8E+5	2.0E+5	8.3E+4	2.1E+5	9.6E+4	1.7E+5	7.2E+4
24h mean In/Out	0.32	0.30	0.28	0.33	0.31	0.29	0.31	0.31	0.01
Highest 8h Outdoor	2.3E+6	2.7E+6	3.3E+6	2.2E+6	1.5E+6	2.9E+6	1.7E+6	2.4E+6	6.0E+5
Highest 8h Indoor	5.4E+5	6.8E+5	8.9E+5	6.4E+5	4.5E+5	7.6E+5	4.7E+5	6.3E+5	1.5E+5
Highest 8 h In/Out	0.23	0.25	0.27	0.29	0.30	0.27	0.27	0.27	0.02
Highest 1h Outdoor	2.4E+6	3.4E+6	5.7E+6	3.9E+6	2.3E+6	3.8E+6	2.3E+6	3.4E+6	1.1E+6
Highest 1 h Indoor ²	5.4E+5	6.8E+5	8.9E+5	6.4E+5	4.5E+5	7.6E+5	4.7E+5	7.5E+5	2.5E+5
Highest 1h In/Out	0.18	0.25	0.21	0.23	0.23	0.23	0.23	0.22	0.02
Time of highest 1h Outdoor	7/3/14 2:41	7/3/14 13:31	7/4/14 22:10	7/5/14 11:58	7/6/14 18:56	7/7/14 16:34	7/8/14 14:07		
Corresponding highest 1h Indoor	7/3/14 3:39	7/3/14 16:00	7/4/14 23:29	7/5/14 14:15	7/6/14 21:19	7/7/14 17:19	7/8/14 15:37		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 7/3/2014 03:00, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-5-R-6. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.3–0.4 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	2.7E+4	2.0E+4	4.1E+4	5.4E+4	4.2E+4	2.5E+4	2.0E+4	3.3E+4	1.2E+4
Outdoor 24 SD	2.0E+4	8.4E+3	4.4E+4	6.0E+4	3.4E+4	8.4E+3	2.6E+3	2.5E+4	2.0E+4
Indoor 24h mean	1.5E+4	9.1E+3	2.6E+4	3.2E+4	2.0E+4	1.1E+4	8.5E+3	1.7E+4	8.3E+3
Indoor 24 SD	5.6E+3	2.6E+3	2.5E+4	2.9E+4	1.2E+4	2.9E+3	1.1E+3	1.1E+4	1.0E+4
24h mean In/Out	0.55	0.51	0.49	0.62	0.52	0.49	0.45	0.52	0.05
Highest 8h Outdoor	7.3E+4	3.0E+4	8.2E+4	1.3E+5	8.3E+4	3.5E+4	2.3E+4	6.5E+4	3.6E+4
Highest 8h Indoor	2.5E+4	1.2E+4	5.4E+4	6.8E+4	3.5E+4	1.4E+4	9.8E+3	3.1E+4	2.1E+4
Highest 8 h In/Out	0.35	0.41	0.66	0.52	0.42	0.40	0.43	0.46	0.10
Highest 1h Outdoor	7.3E+4	3.8E+4	1.6E+5	1.8E+5	1.1E+5	4.3E+4	2.6E+4	8.9E+4	5.6E+4
Highest 1 h Indoor ²	2.5E+4	1.2E+4	5.4E+4	6.8E+4	3.5E+4	1.4E+4	9.8E+3	3.9E+4	3.0E+4
Highest 1h In/Out	0.35	0.37	0.49	0.52	0.34	0.37	0.41	0.41	0.06
Time of highest 1h Outdoor	7/2/14 18:57	7/3/14 17:07	7/4/14 22:31	7/5/14 11:48	7/6/14 18:56	7/7/14 19:31	7/8/14 13:17		
Corresponding highest 1h Indoor	7/2/14 19:40	7/3/14 17:44	7/5/14 0:30	7/5/14 14:59	7/6/14 20:01	7/7/14 20:27	7/8/14 14:16		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 7/3/2014 03:00, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-5-R-7. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.4–0.5 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	5.0E+3	3.5E+3	8.0E+3	1.1E+4	6.2E+3	3.1E+3	3.0E+3	5.7E+3	2.7E+3
Outdoor 24 SD	3.6E+3	8.0E+2	8.7E+3	1.4E+4	5.5E+3	9.9E+2	6.7E+2	4.9E+3	4.7E+3
Indoor 24h mean	2.1E+3	1.5E+3	4.5E+3	4.4E+3	2.5E+3	1.2E+3	1.1E+3	2.5E+3	1.3E+3
Indoor 24 SD	4.4E+2	1.5E+2	3.8E+3	4.2E+3	1.6E+3	2.6E+2	1.8E+2	1.5E+3	1.6E+3
24h mean In/Out	0.43	0.42	0.43	0.48	0.42	0.43	0.41	0.43	0.02
Highest 8h Outdoor	1.0E+4	4.9E+3	1.6E+4	2.8E+4	1.3E+4	4.3E+3	3.8E+3	1.1E+4	7.9E+3
Highest 8h Indoor	2.9E+3	1.8E+3	9.0E+3	9.6E+3	4.5E+3	1.6E+3	1.4E+3	4.4E+3	3.3E+3
Highest 8 h In/Out	0.29	0.38	0.55	0.35	0.35	0.36	0.36	0.38	0.08
Highest 1h Outdoor	1.1E+4	5.0E+3	3.4E+4	4.7E+4	1.7E+4	5.3E+3	4.0E+3	1.8E+4	1.5E+4
Highest 1 h Indoor ²	2.9E+3	1.8E+3	9.0E+3	9.6E+3	4.5E+3	1.6E+3	1.4E+3	5.7E+3	5.1E+3
Highest 1h In/Out	0.21	0.34	0.39	0.29	0.33	0.33	0.35	0.32	0.05
Time of highest 1h Outdoor	7/3/14 1:57	7/3/14 17:07	7/4/14 22:31	7/5/14 11:58	7/6/14 13:55	7/7/14 19:32	7/9/14 5:20		
Corresponding highest 1h Indoor	7/3/14 3:40	7/3/14 17:09	7/5/14 0:15	7/5/14 14:46	7/6/14 16:00	7/7/14 20:23	7/9/14 5:48		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 7/3/2014 03:00, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-5-R-8. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.5–0.7 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	4.6E+3	3.9E+3	5.7E+3	5.8E+3	3.1E+3	1.8E+3	1.3E+3	3.8E+3	1.6E+3
Outdoor 24 SD	2.5E+3	6.2E+2	4.9E+3	7.1E+3	2.0E+3	4.3E+2	2.6E+2	2.5E+3	2.4E+3
Indoor 24h mean	1.3E+3	1.3E+3	2.5E+3	2.0E+3	1.1E+3	6.2E+2	4.5E+2	1.3E+3	6.8E+2
Indoor 24 SD	3.9E+2	2.8E+2	1.6E+3	1.9E+3	4.7E+2	8.8E+1	7.6E+1	6.8E+2	6.8E+2
24h mean In/Out	0.28	0.32	0.34	0.41	0.36	0.36	0.35	0.35	0.04
Highest 8h Outdoor	5.2E+3	5.6E+3	1.0E+4	1.4E+4	5.3E+3	2.3E+3	1.5E+3	6.2E+3	4.0E+3
Highest 8h Indoor	1.7E+3	1.7E+3	4.4E+3	4.3E+3	1.7E+3	7.0E+2	5.0E+2	2.1E+3	1.5E+3
Highest 8 h In/Out	0.33	0.31	0.44	0.31	0.32	0.31	0.33	0.34	0.04
Highest 1h Outdoor	9.7E+3	4.6E+3	1.8E+4	2.5E+4	7.7E+3	2.6E+3	1.7E+3	9.9E+3	8.0E+3
Highest 1 h Indoor ²	1.7E+3	1.7E+3	4.4E+3	4.3E+3	1.7E+3	7.0E+2	5.0E+2	2.7E+3	2.3E+3
Highest 1h In/Out	0.20	0.36	0.35	0.25	0.22	0.28	0.30	0.28	0.06
Time of highest 1h Outdoor	7/3/14 2:42	7/3/14 12:19	7/4/14 22:31	7/5/14 11:57	7/6/14 18:56	7/7/14 19:37	7/9/14 5:20		
Corresponding highest 1h Indoor	7/3/14 3:43	7/3/14 13:58	7/5/14 0:03	7/5/14 14:38	7/6/14 19:57	7/7/14 20:33	7/9/14 5:39		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 7/3/2014 03:00, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-5-R-9. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.7–1.0 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	1.9E+3	2.0E+3	1.8E+3	1.4E+3	8.1E+2	5.9E+2	3.4E+2	1.3E+3	6.3E+2
Outdoor 24 SD	7.8E+2	4.0E+2	1.1E+3	1.4E+3	2.6E+2	1.6E+2	7.4E+1	5.9E+2	4.7E+2
Indoor 24h mean	3.8E+2	4.6E+2	5.2E+2	3.7E+2	2.0E+2	1.5E+2	8.6E+1	3.1E+2	1.5E+2
Indoor 24 SD	1.8E+2	1.5E+2	1.7E+2	3.2E+2	4.0E+1	4.3E+1	2.3E+1	1.3E+2	9.9E+1
24h mean In/Out	0.17	0.22	0.24	0.28	0.27	0.25	0.25	0.24	0.03
Highest 8h Outdoor	2.3E+3	2.5E+3	2.4E+3	3.0E+3	9.3E+2	8.8E+2	4.3E+2	1.8E+3	9.3E+2
Highest 8h Indoor	6.2E+2	6.4E+2	6.8E+2	7.5E+2	2.3E+2	2.1E+2	1.1E+2	4.6E+2	2.5E+2
Highest 8 h In/Out	0.27	0.26	0.28	0.25	0.25	0.24	0.26	0.26	0.01
Highest 1h Outdoor	3.3E+3	2.7E+3	3.8E+3	5.1E+3	1.4E+3	8.5E+2	4.9E+2	2.5E+3	1.6E+3
Highest 1 h Indoor ²	6.2E+2	6.4E+2	6.8E+2	7.5E+2	2.3E+2	2.1E+2	1.1E+2	5.2E+2	3.2E+2
Highest 1h In/Out	0.19	0.25	0.20	0.21	0.16	0.24	0.25	0.21	0.03
Time of highest 1h Outdoor	7/3/14 2:42	7/3/14 10:54	7/4/14 18:38	7/5/14 11:57	7/6/14 18:56	7/7/14 9:34	7/8/14 10:22		
Corresponding highest 1h Indoor	7/3/14 6:38	7/3/14 13:17	7/4/14 22:38	7/5/14 14:26	7/6/14 20:23	7/7/14 13:34	7/8/14 12:37		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 7/3/2014 03:00, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-5-R-10. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 1.0–2.5 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	1.1E+3	1.5E+3	1.1E+3	7.9E+2	5.1E+2	4.6E+2	2.7E+2	8.2E+2	4.0E+2
Outdoor 24 SD	3.1E+2	3.4E+2	5.4E+2	6.6E+2	1.1E+2	1.6E+2	5.6E+1	3.1E+2	2.1E+2
Indoor 24h mean	1.7E+2	2.1E+2	1.9E+2	1.4E+2	7.9E+1	6.7E+1	4.0E+1	1.3E+2	6.1E+1
Indoor 24 SD	8.3E+1	7.8E+1	5.9E+1	1.2E+2	1.7E+1	2.5E+1	1.1E+1	5.5E+1	3.7E+1
24h mean In/Out	0.11	0.15	0.15	0.18	0.17	0.15	0.15	0.15	0.02
Highest 8h Outdoor	1.3E+3	1.8E+3	1.4E+3	1.6E+3	5.6E+2	6.4E+2	3.3E+2	1.1E+3	5.3E+2
Highest 8h Indoor	2.7E+2	3.0E+2	2.4E+2	2.8E+2	8.9E+1	9.4E+1	5.3E+1	1.9E+2	9.8E+1
Highest 8 h In/Out	0.21	0.16	0.17	0.18	0.16	0.15	0.16	0.17	0.02
Highest 1h Outdoor	1.7E+3	2.2E+3	1.9E+3	2.5E+3	7.1E+2	7.6E+2	3.8E+2	1.5E+3	7.7E+2
Highest 1 h Indoor ²	2.7E+2	3.0E+2	2.4E+2	2.8E+2	8.9E+1	9.4E+1	5.3E+1	2.1E+2	1.2E+2
Highest 1h In/Out	0.17	0.15	0.12	0.15	0.10	0.14	0.16	0.14	0.02
Time of highest 1h Outdoor	7/3/14 2:42	7/3/14 12:02	7/4/14 18:38	7/5/14 11:57	7/6/14 18:56	7/7/14 9:34	7/8/14 10:14		
Corresponding highest 1h Indoor	7/3/14 6:39	7/3/14 13:45	7/4/14 22:38	7/5/14 13:07	7/6/14 19:45	7/7/14 13:34	7/8/14 12:26		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 7/3/2014 03:00, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-5-R-11. Summary statistics for estimated PM_{2.5} concentrations (µg m⁻³) calculated from particle number concentrations resolved by size from 6 nm to 2.5 microns (as reported in Tables SU-5-R-2 to SU-5-R-9) and resulting indoor/outdoor ratios.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	1.7E+1	2.1E+1	2.2E+1	1.7E+1	1.3E+1	1.4E+1	9.4E+0	1.6E+1	4.1E+0
Outdoor 24 SD	5.7E+0	6.0E+0	1.2E+1	1.4E+1	4.3E+0	4.9E+0	2.5E+0	7.1E+0	3.9E+0
Indoor 24h mean	4.2E+0	4.4E+0	6.5E+0	5.3E+0	3.6E+0	3.5E+0	2.5E+0	4.3E+0	1.2E+0
Indoor 24 SD	5.5E-1	8.8E-1	2.9E+0	3.8E+0	1.1E+0	9.7E-1	4.0E-1	1.5E+0	1.2E+0
24h mean In/Out	0.25	0.23	0.23	0.32	0.30	0.26	0.27	0.27	0.03
Highest 8h Outdoor	2.0E+1	2.7E+1	3.1E+1	3.4E+1	1.6E+1	2.0E+1	1.2E+1	2.3E+1	7.4E+0
Highest 8h Indoor	4.5E+0	5.4E+0	9.8E+0	1.0E+1	5.0E+0	4.7E+0	2.9E+0	6.0E+0	2.5E+0
Highest 8 h In/Out	0.23	0.20	0.31	0.30	0.30	0.24	0.24	0.26	0.04
Highest 1h Outdoor	2.9E+1	3.2E+1	5.2E+1	5.4E+1	2.4E+1	2.4E+1	1.6E+1	3.3E+1	1.4E+1
Highest 1 h Indoor ²	4.5E+0	5.4E+0	9.8E+0	1.0E+1	5.0E+0	4.7E+0	2.9E+0	7.5E+0	3.9E+0
Highest 1h In/Out	0.18	0.20	0.26	0.25	0.22	0.21	0.21	0.22	0.03
Time of highest 1h Outdoor	7/3/14 2:42	7/3/14 13:25	7/4/14 22:11	7/5/14 11:57	7/6/14 18:56	7/7/14 16:35	7/8/14 13:51		
Corresponding highest 1h Indoor	7/3/14 3:42	7/3/14 14:38	7/4/14 23:36	7/5/14 14:31	7/6/14 20:29	7/7/14 17:19	7/8/14 15:07		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 7/3/2014 03:00, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-5-R-12. Summary statistics for concentrations of PM_{2.5} (µg m⁻³) and indoor /outdoor ratios from measurements reported by TSI DustTrak II.

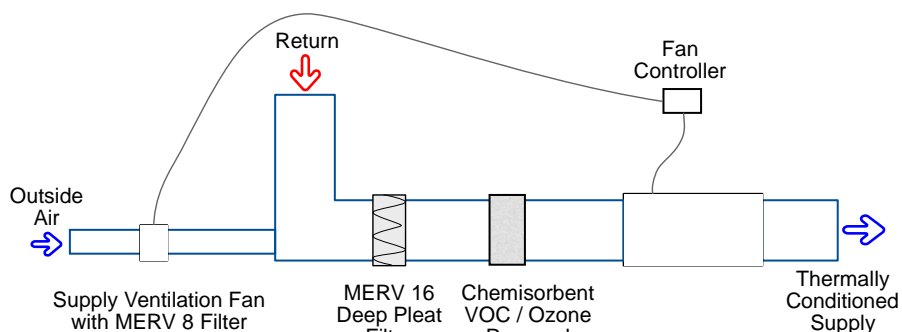
Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	2.0E-2	1.7E-2	3.4E-2	4.7E-2	2.5E-2	1.4E-2	9.6E-3	2.4E-2	1.2E-2
Outdoor 24 SD	1.3E-2	5.1E-3	3.9E-2	6.5E-2	2.1E-2	6.0E-3	2.6E-3	2.2E-2	2.1E-2
Indoor 24h mean	7.5E-3	5.6E-3	1.4E-2	1.6E-2	8.3E-3	4.6E-3	3.1E-3	8.4E-3	4.4E-3
Indoor 24 SD	1.3E-3	1.4E-3	1.1E-2	1.7E-2	5.0E-3	1.5E-3	1.4E-3	5.5E-3	5.7E-3
24h mean In/Out	0.35	0.35	0.32	0.38	0.35	0.35	0.34	0.35	0.02
Highest 8h Outdoor	3.9E-2	2.3E-2	6.9E-2	1.2E-1	4.8E-2	2.1E-2	1.2E-2	4.8E-2	3.4E-2
Highest 8h Indoor	9.6E-3	6.7E-3	2.7E-2	3.7E-2	1.4E-2	6.2E-3	4.2E-3	1.5E-2	1.1E-2
Highest 8 h In/Out	0.25	0.29	0.39	0.31	0.30	0.29	0.34	0.31	0.04
Highest 1h Outdoor	4.5E-2	2.6E-2	1.6E-1	2.3E-1	7.4E-2	2.4E-2	1.5E-2	8.2E-2	7.6E-2
Highest 1 h Indoor ²	9.6E-3	6.7E-3	2.7E-2	3.7E-2	1.4E-2	6.2E-3	4.2E-3	1.9E-2	1.8E-2
Highest 1h In/Out	0.18	0.31	0.25	0.23	0.21	0.27	0.35	0.26	0.05
Time of highest 1h Outdoor	7/3/14 1:58	7/3/14 14:46	7/4/14 22:31	7/5/14 11:58	7/6/14 18:56	7/7/14 19:31	7/8/14 13:19		
Corresponding highest 1h Indoor	7/3/14 3:36	7/3/14 14:46	7/5/14 0:00	7/5/14 14:42	7/6/14 20:29	7/7/14 20:28	7/8/14 14:13		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 7/3/2014 03:00, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-5-R-13. Daily¹ summary statistics for concentrations (nanograms m⁻³) and indoor /outdoor ratios of aerosol black carbon measured using the Aethalometer AE22.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	3.4E+2	3.6E+2	4.0E+2	4.5E+2	3.6E+2	4.9E+2	3.2E+2	3.9E+2	5.6E+1
Outdoor 24 SD	2.4E+2	1.1E+2	5.2E+2	5.3E+2	2.0E+2	2.0E+2	1.3E+2	2.8E+2	1.6E+2
Indoor 24h mean	1.5E+2	1.4E+2	1.8E+2	1.8E+2	1.6E+2	1.9E+2	1.3E+2	1.6E+2	2.3E+1
Indoor 24 SD	3.2E+1	2.9E+1	8.2E+1	1.3E+2	3.0E+1	5.8E+1	4.4E+1	5.8E+1	3.5E+1
24h mean In/Out	0.39	0.40	0.41	0.42	0.45	0.40	0.42	0.41	0.02
Highest 8h Outdoor	5.9E+2	4.6E+2	7.0E+2	9.4E+2	4.4E+2	6.9E+2	4.5E+2	6.1E+2	1.7E+2
Highest 8h Indoor	1.8E+2	1.7E+2	2.6E+2	3.5E+2	1.6E+2	2.6E+2	1.8E+2	2.2E+2	6.4E+1
Highest 8 h In/Out	0.30	0.36	0.37	0.37	0.37	0.38	0.41	0.37	0.03
Highest 1h Outdoor	8.1E+2	5.1E+2	2.5E+3	1.9E+3	7.5E+2	9.0E+2	5.4E+2	1.1E+3	7.0E+2
Highest 1 h Indoor ²	1.8E+2	1.7E+2	2.6E+2	3.5E+2	1.6E+2	2.6E+2	1.8E+2	2.7E+2	1.1E+2
Highest 1h In/Out	0.24	0.35	0.16	0.24	0.24	0.32	0.37	0.28	0.07
Time of highest 1h Outdoor	7/3/14 2:39	7/3/14 16:45	7/4/14 18:09	7/5/14 11:06	7/7/14 1:54	7/7/14 10:06	7/8/14 13:24		
Corresponding highest 1h Indoor	7/3/14 3:39	7/3/14 16:45	7/4/14 19:00	7/5/14 14:09	7/7/14 2:27	7/7/14 13:36	7/8/14 16:18		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 7/3/2014 03:00, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Appendix SU-6-D. Results for System D, July 9-16, 2014.**Table SU-6-D-1. Description of System D component characteristics during the period of July 9-16, 2014**

System Parameter	Description or Measured Value
Heating	75,000 BTU/h, 80% eff., gas furnace, 1-stage burner
Cooling	3 ton, SEER13 air conditioner
Thermal distribution	Central fan with PSC motor: 1052 cfm for cooling, 957 cfm for heating
Ventilation	Supply fan discharging into the return plenum. Set to 114 cfm with the fan cyclers running for 20 minutes every hour.
Filtration	MERV16, 5" (Lennox X8313) deep pleated filter installed inside the FAU cabinet. MERV8 on the supply fan discharge.
Recirculation blower schedule	As required for thermal conditioning, with fan cyclers providing a minimum of 20 minutes per hour.
VOC removal system	Purafill PuraGRID product made with a proprietary "IAQ" mix (mostly activated carbon)

Notes about this monitoring period

Both DustTrak instruments were dropping out data during the beginning of the operational period. The DustTrak indoor / outdoor data stream was constructed using the best data stream from a single instrument. The majority of the operational period had the indoor DustTrak numbers at the instrument's lower detection limit (LDL). We were also at or below the LDL for indoor black carbon measurements for the majority of the period. All other instruments were fine.

The 24 h running statistics in the figures starts at 7/9/2014 20:00. Data from 7/11/2014 06:00 to 7/13/2014 08:00 was censored from the two largest Met1 channels due to indoor activity associated with changing sorbent tubes.

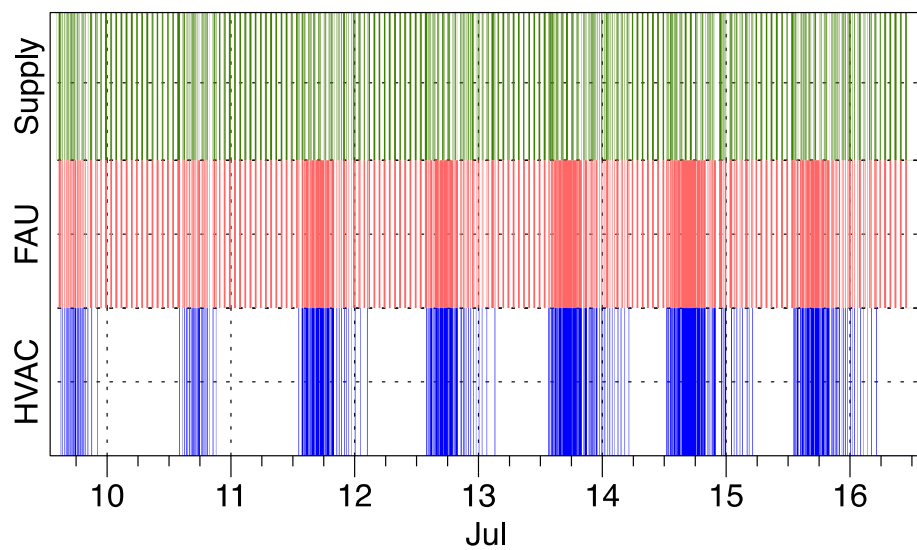


Figure SU-6-D-1. Operation of mechanical systems: Supply fan; fan on central forced air unit (FAU); central air-conditioning (AC).

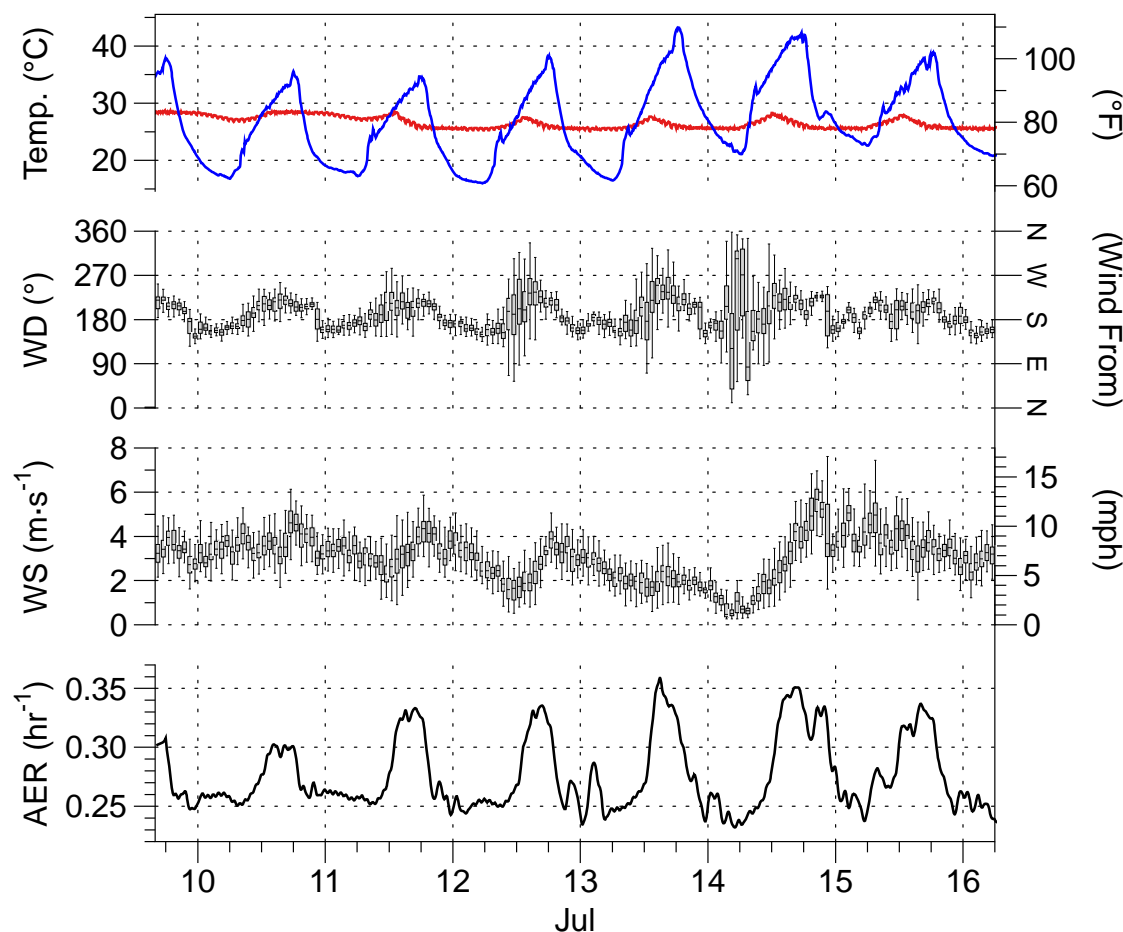


Figure SU-6-D-2. Environmental parameters measured during operation of System D, July 9-16, 2014.

From top to bottom: indoor (red) and outdoor (blue) temperatures, wind direction (WD) in units of degrees from North, wind speed (WS), and air exchange rate (AER). For WD and WS, the box for each hour shows the 25th, 50th and 75th percentiles of the measured values and whiskers extend 1.5X the interquartile range (75th–25th percentile values) above the 75th and below the 25th percentile values.

Guide to plots of pollutant concentration time series and indoor / outdoor (I/O) ratios

The bottom section of each plot shows outdoor and indoor time series using the resolution of data collection: 3-min for black carbon and 1-min for all other parameters. The top and bottom of grey band are LOESS-smoothed, 1-min (or 3-min for black carbon) time-series. Also shown are time series with 1h and 24h time averaging for most pollutants and 1h and 8h average for ozone. Triangles in bottom of plot indicate the highest 1h outdoor and corresponding highest 1h indoor average during each day. The top section of each plot shows the ratio of indoor to outdoor running 24h mean values (8h for ozone) and the ratios of highest 1h indoor to corresponding highest 1h outdoor concentration each day.

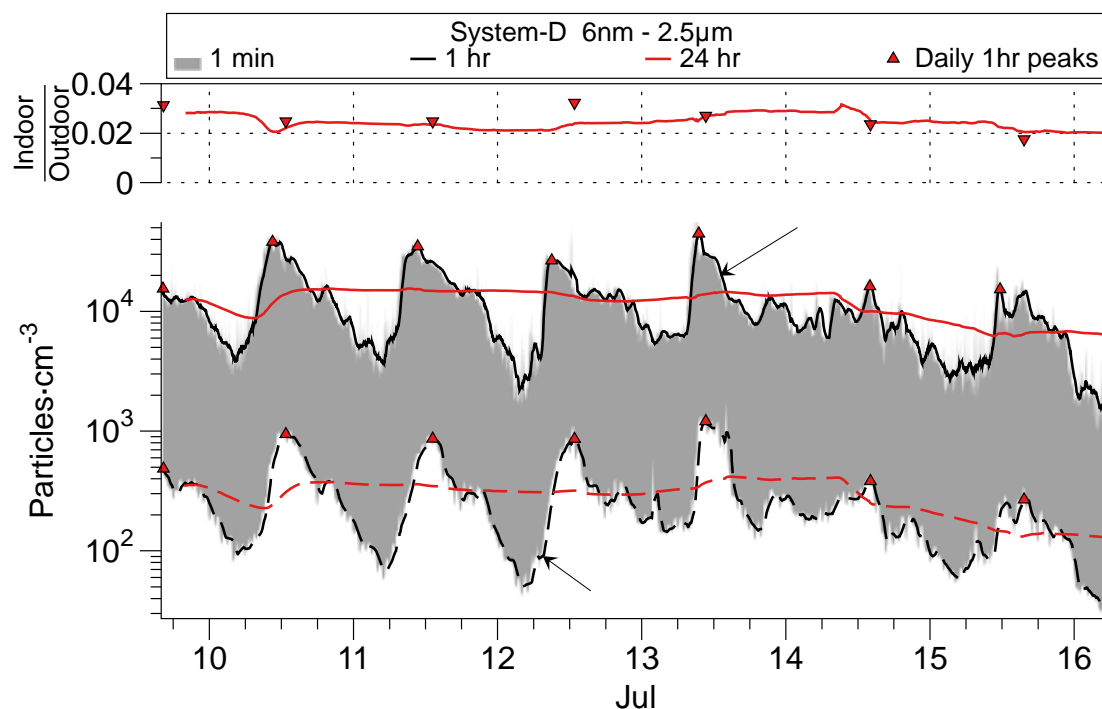


Figure SU-6-D-3. Number concentrations of 6 nm to 2.5 μm diameter particles measured outdoors and indoors during operation of System D, July 9-16, 2014. Data collected using TSI 3787 CPCs.

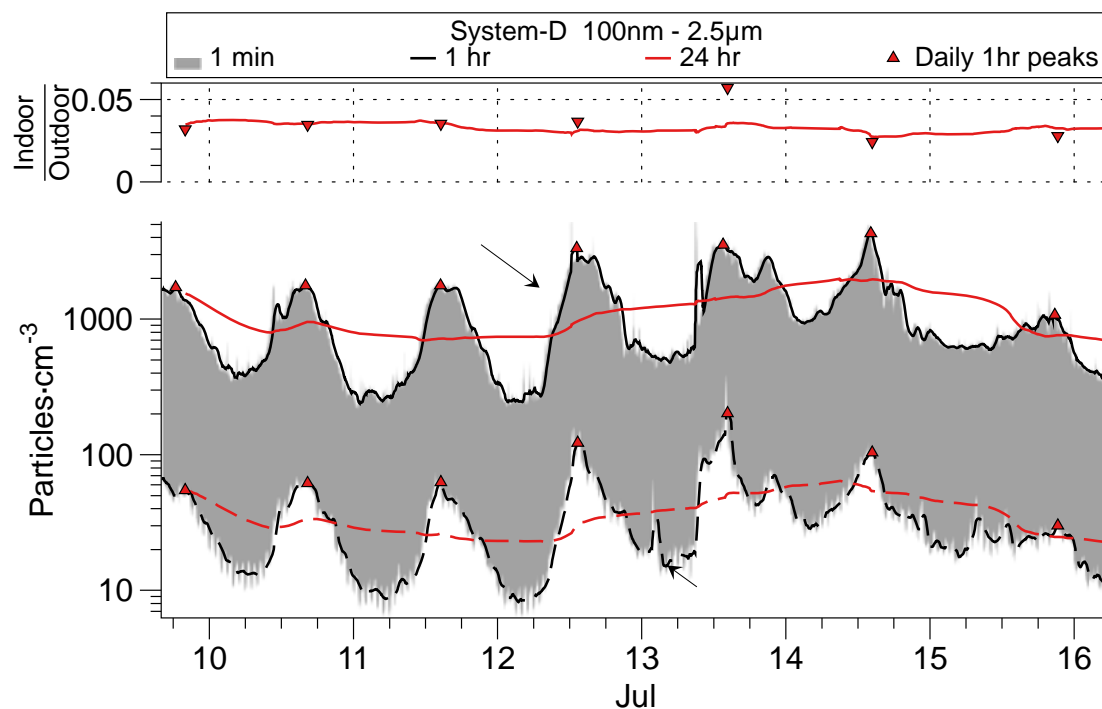


Figure SU-6-D-4. Number concentrations of 100 nm to 2.5 μm diameter particles measured outdoors and indoors during operation of System D, July 9-16, 2014. Data collected using TSI 3781 CPCs outfitted with screens to exclude particles smaller than 100 nm. Refer to “Guide” before Figure SU-6-D-3.

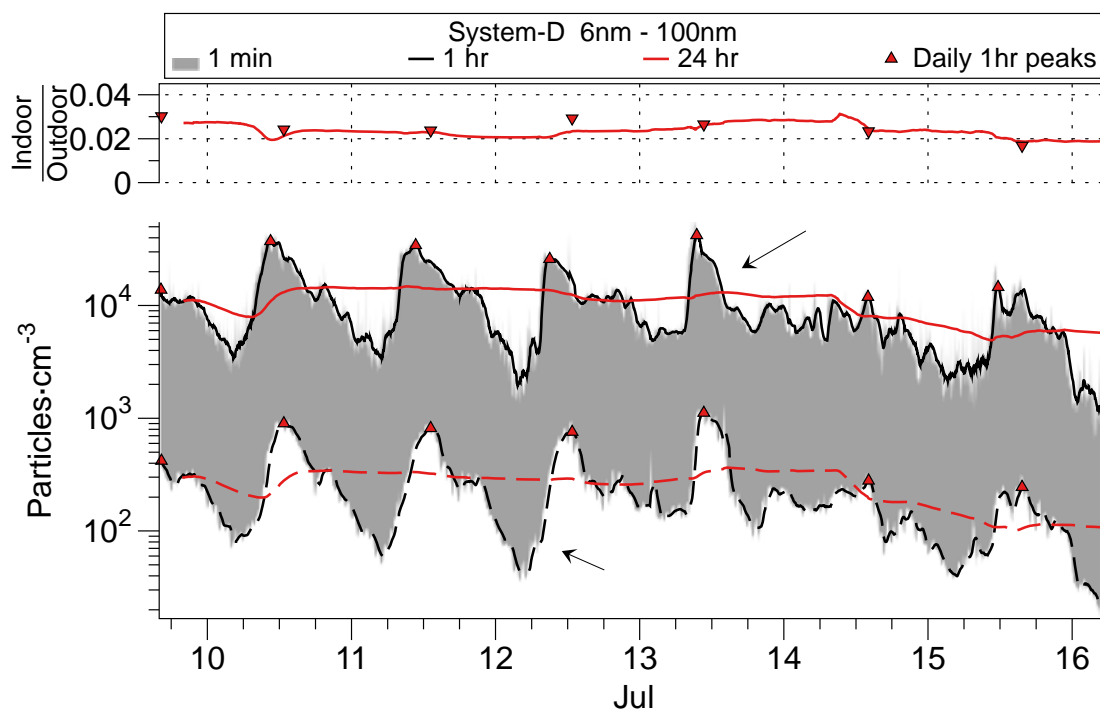


Figure SU-6-D-5. Number concentrations of 6–100 nm diameter particles measured outdoors and indoors during operation of System D, July 9-16, 2014. Data obtained as the difference between time series show in prior two figures. Refer to “Guide” before Figure SU-6-D-3.

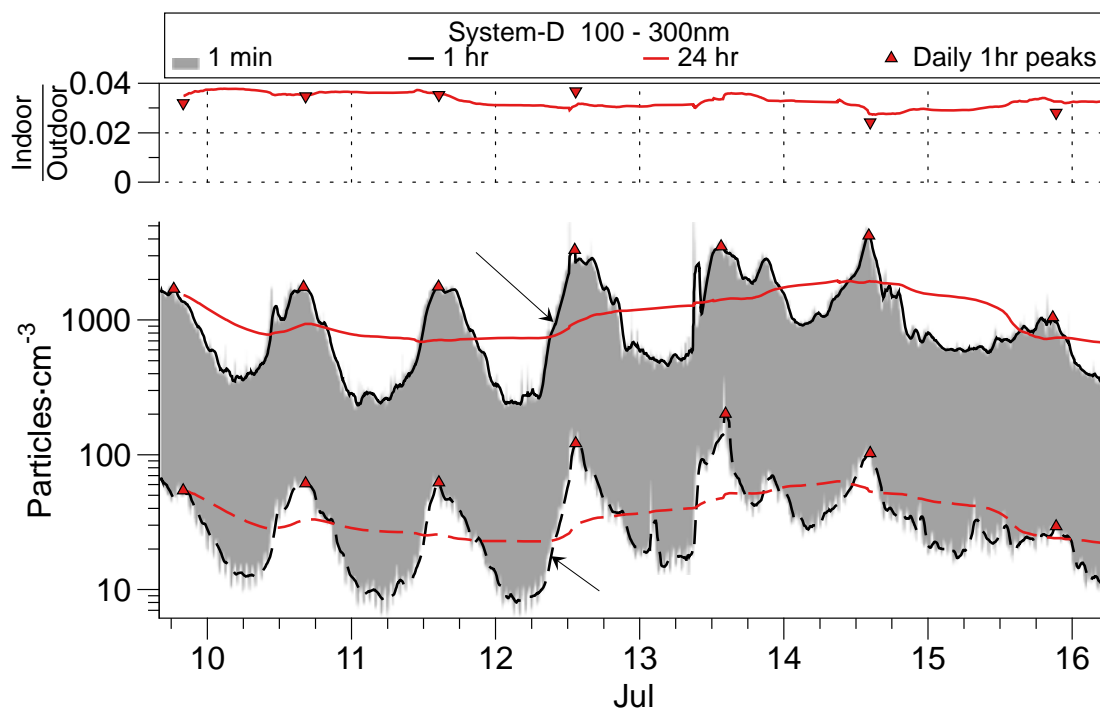


Figure SU-6-D-6. Number concentrations of 100–300 nm diameter particles measured outdoors and indoors during operation of System D, July 9-16, 2014. Data obtained as the difference between the TSI 3781 CPC with size selector and the MetOne BT637S OPC. Refer to “Guide” before Figure SU-6-D-3.

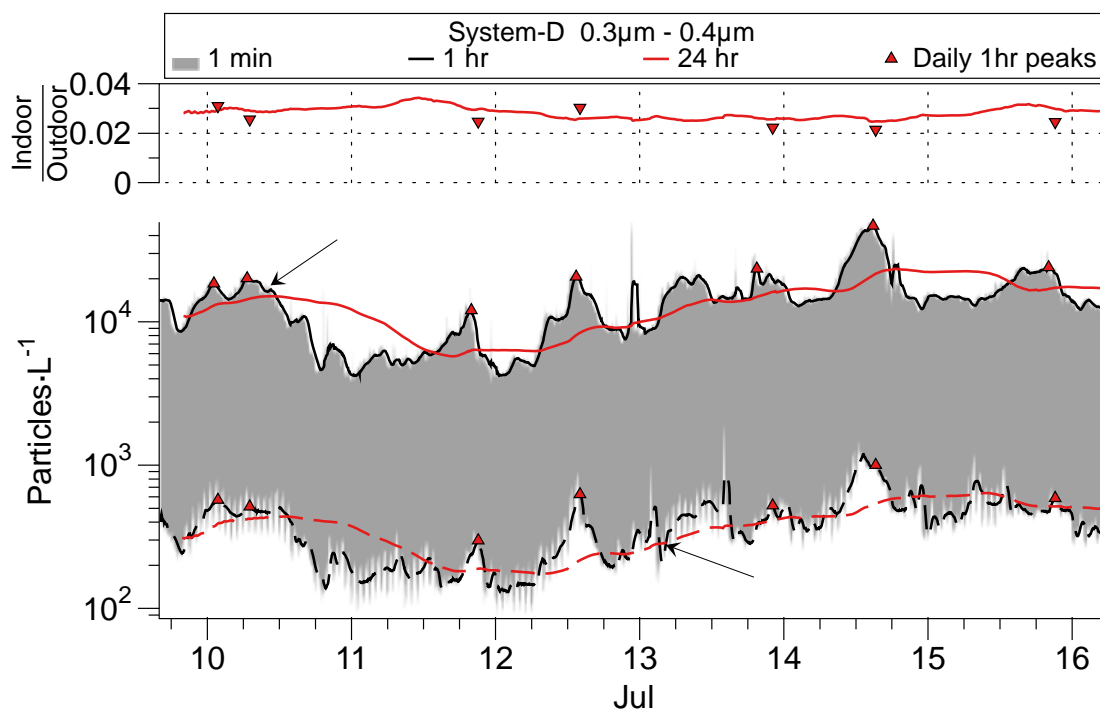


Figure SU-6-D-7. Number concentrations of 0.3–0.4 μm diameter particles measured outdoors and indoors during operation of System D, July 9-16, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-6-D-3.

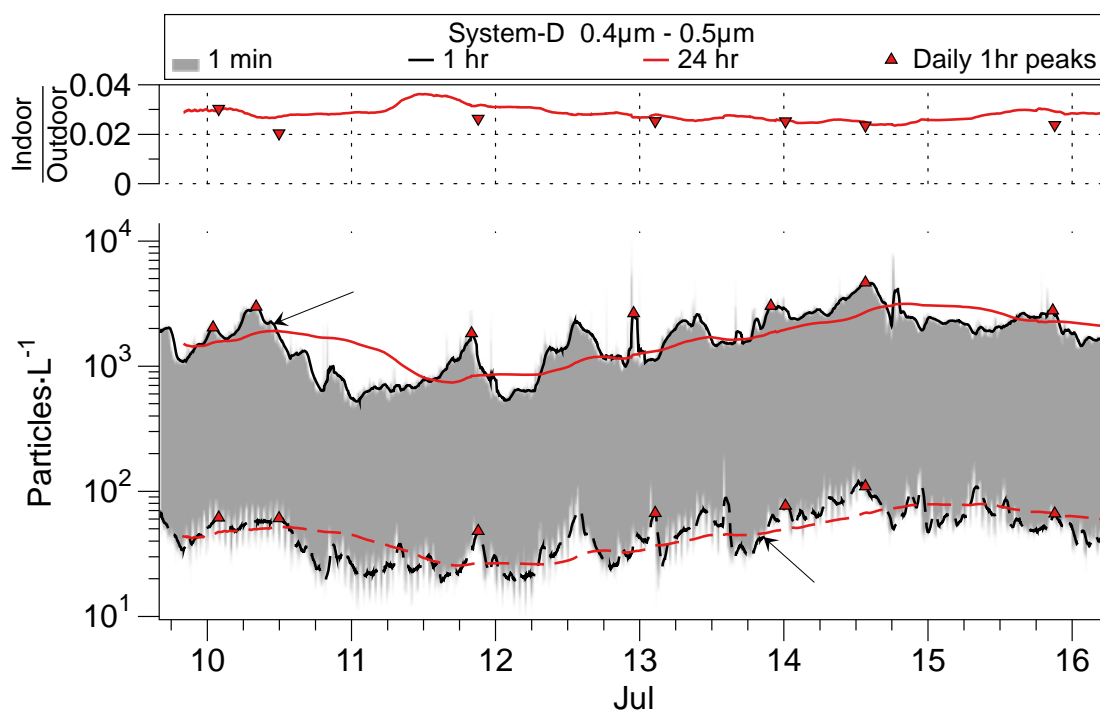


Figure SU-6-D-8. Number concentrations of 0.4–0.5 μm diameter particles measured outdoors and indoors during operation of System D, July 9-16, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-6-D-3.

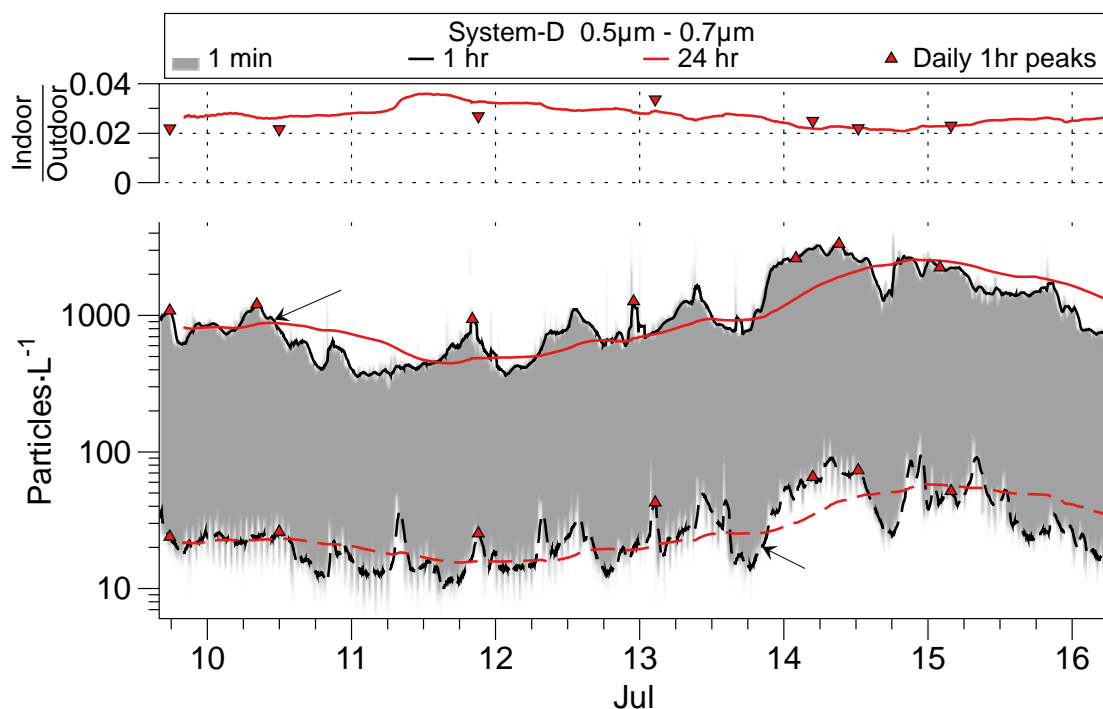


Figure SU-6-D-9. Number concentrations of 0.5–0.7 μm diameter particles measured outdoors and indoors during operation of System D, July 9-16, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-6-D-3.

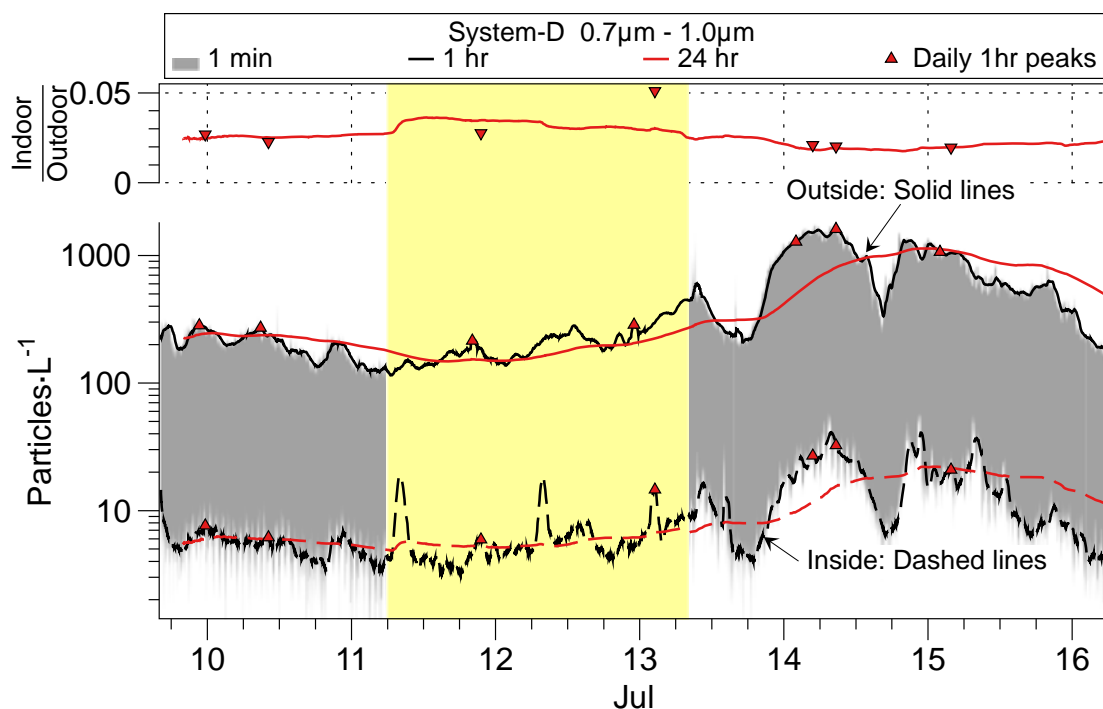


Figure SU-6-D-10. Number concentrations of 0.7–1.0 μm diameter particles measured outdoors and indoors during operation of System D, July 9-16, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-6-D-3. The yellow band indicates censored data due to in house activity.

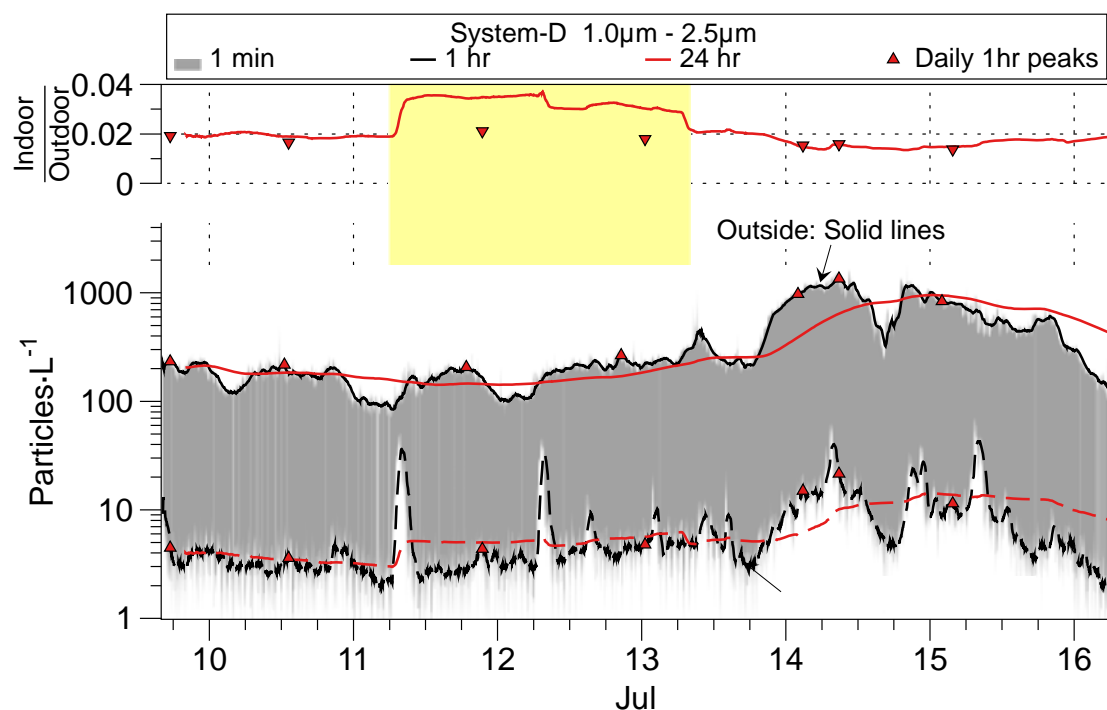


Figure SU-6-D-11. Number concentrations of 1.0–2.5 μm diameter particles measured outdoors and indoors during operation of System D, July 9-16, 2014. Data collected using MetOne BT637S particle counters. Refer to Figure SU-6-D-3 for details. The yellow band indicates censored data due to in house activity.

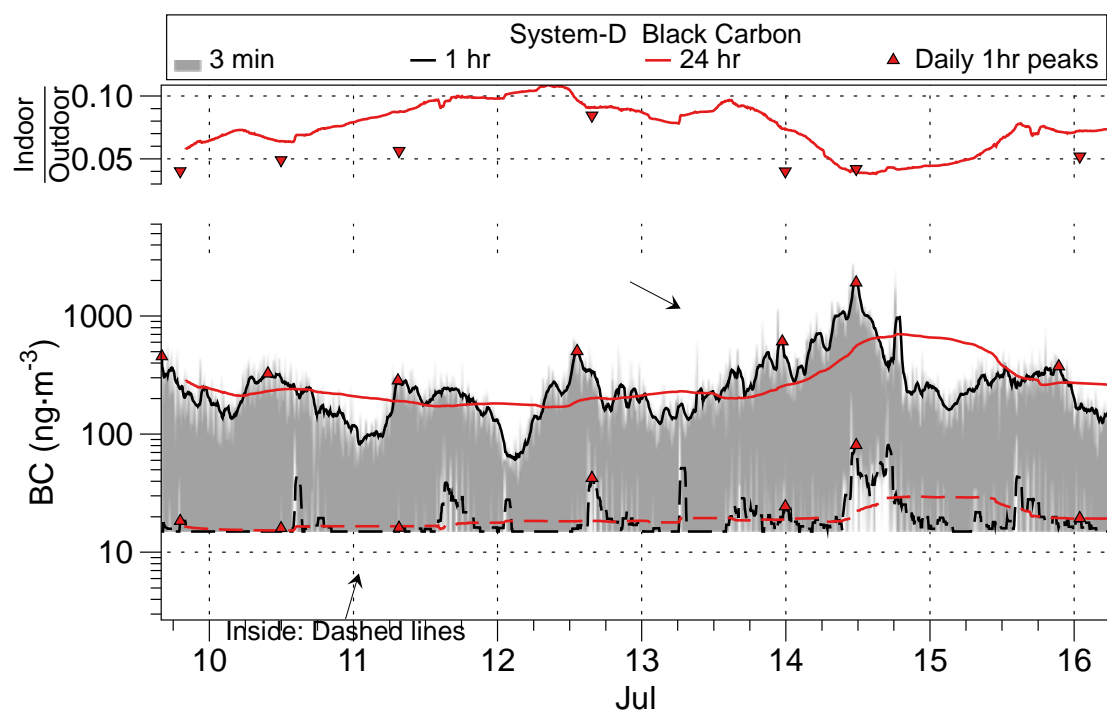


Figure SU-6-D-12. Black carbon concentrations measured outdoors and indoors during operation of System D, July 9-16, 2014. Data collected using AE22 Aethalometers with 3-min samples. Data otherwise as described in Figure SU-6-D-3 caption.

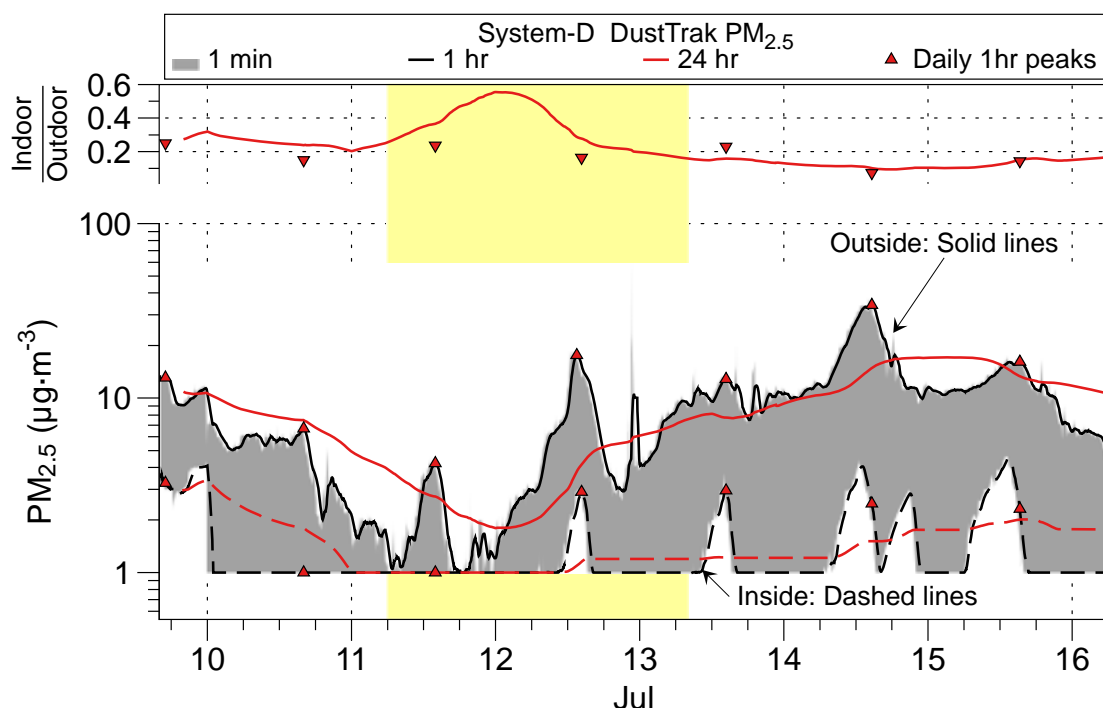


Figure SU-6-D-13. $PM_{2.5}$ reported by TSI DustTrak II 8530 measurements outdoors and indoors during operation of System D, July 9-16, 2014. The DustTrak measures light scattering and uses a calibration to estimate $PM_{2.5}$ mass. Refer to “Guide” before Figure SU-6-D-3. The yellow band indicates censored data due to in house activity.

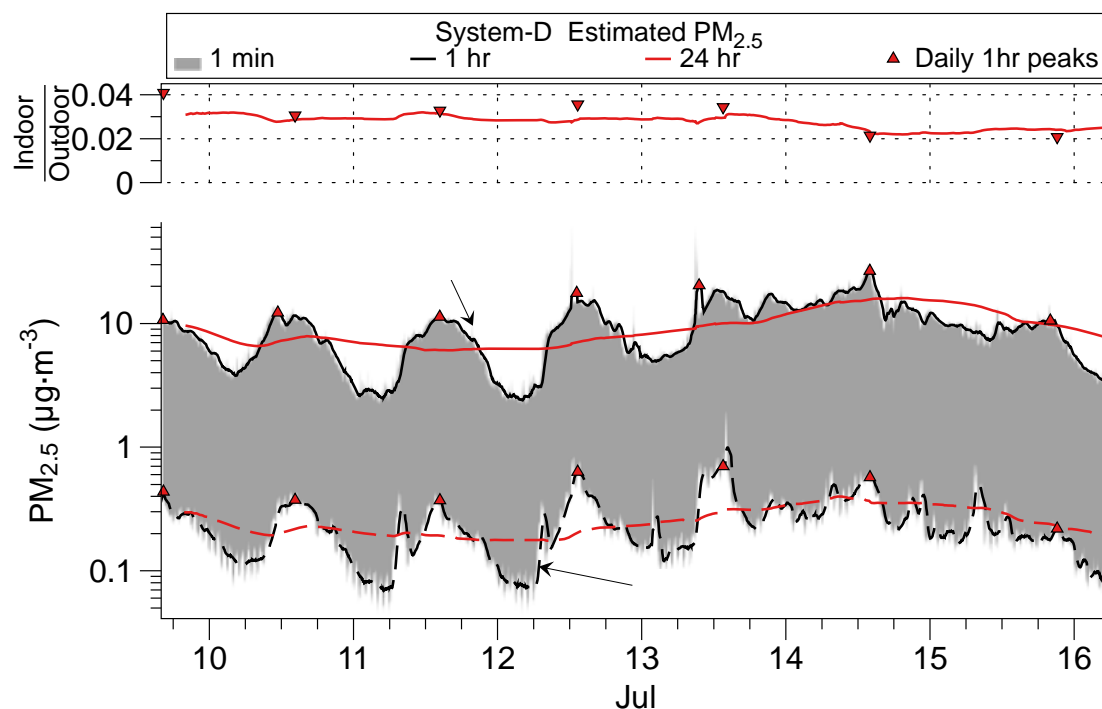


Figure SU-6-D-14. Estimated $PM_{2.5}$ concentration calculated from size-resolved particle number concentrations measured by MetOne and CPC during operation of System D, July 9-16, 2014. Details provided in body of report. Refer to “Guide” before Figure SU-6-D-3.

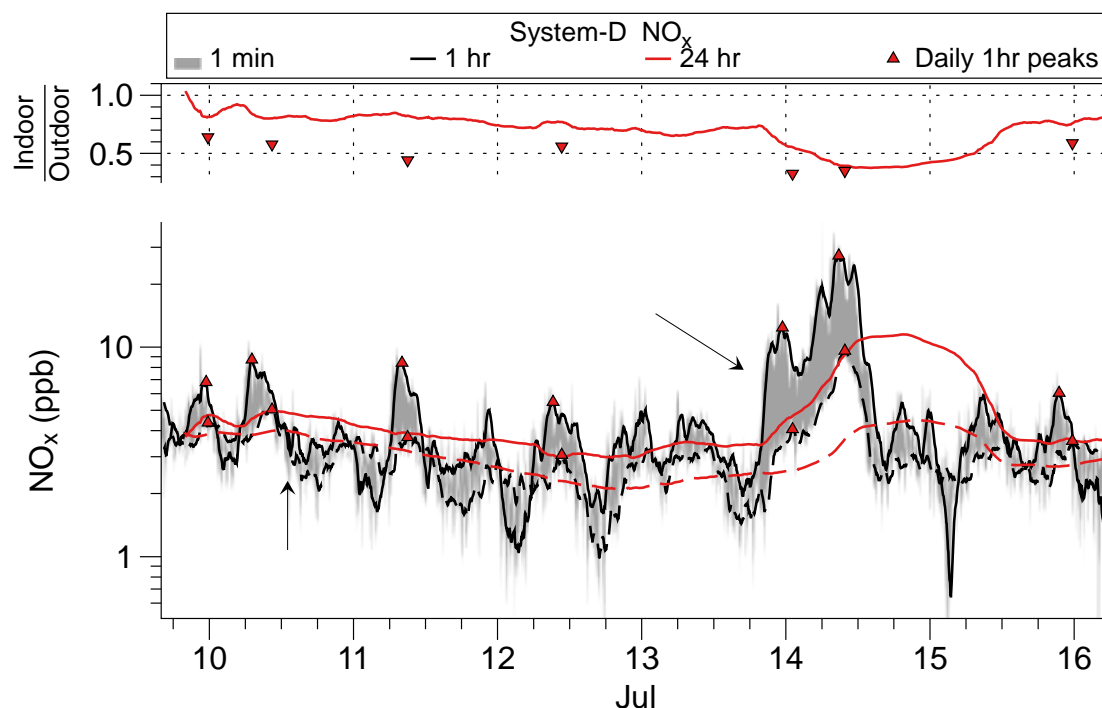


Figure SU-6-D-15. Nitrogen oxides concentrations measured outdoors and indoors during operation of System D, July 9-16, 2014. Data collected using API 200A and 200E chemiluminescence analyzers.

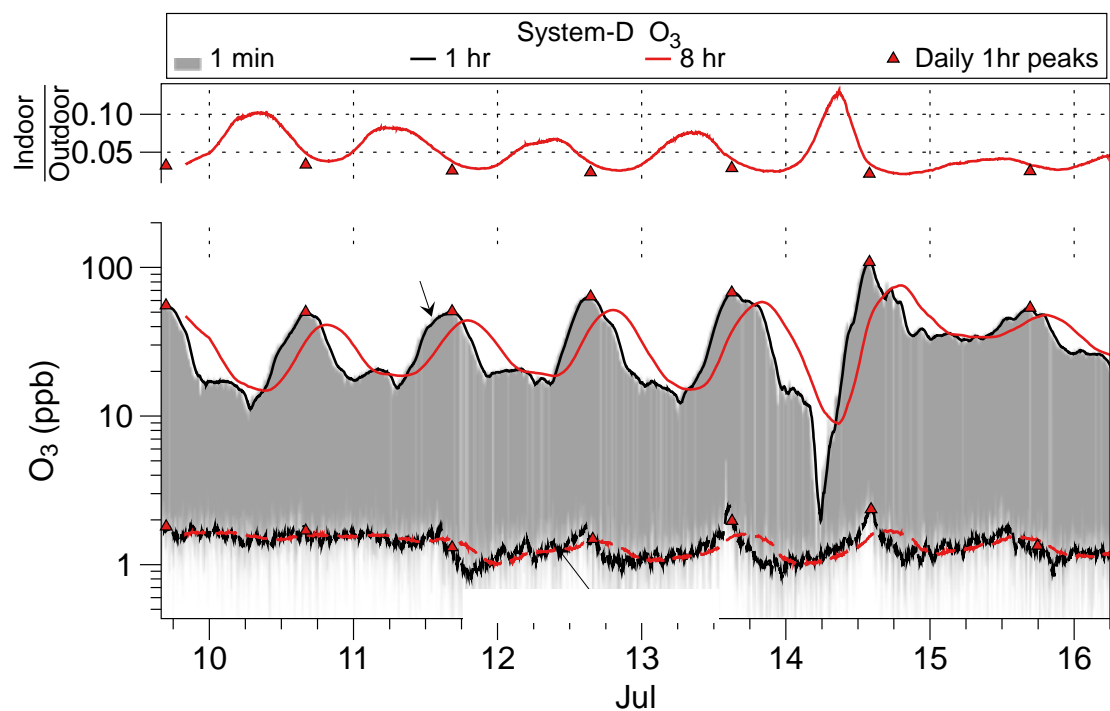


Figure SU-6-D-16. Ozone concentrations measured outdoors and indoors during operation of System D, July 9-16, 2014. Data collected using 2B Technologies Model 202 analyzers.

Table SU-6-D-2. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 6 nm to 2.5 micron measured using the TSI 3787 CPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	1.1E+4	1.5E+4	1.5E+4	1.2E+4	1.4E+4	8.2E+3	6.6E+3	1.2E+4	3.1E+3
Outdoor 24 SD	2.9E+3	1.0E+4	9.5E+3	7.5E+3	1.0E+4	3.3E+3	4.3E+3	6.9E+3	3.1E+3
Indoor 24h mean	3.0E+2	3.6E+2	3.1E+2	3.1E+2	4.0E+2	2.0E+2	1.3E+2	2.9E+2	8.5E+1
Indoor 24 SD	7.9E+1	2.7E+2	2.4E+2	2.3E+2	3.6E+2	7.9E+1	6.8E+1	1.9E+2	1.1E+2
24h mean In/Out	0.03	0.02	0.02	0.02	0.03	0.03	0.02	0.03	0.00
Highest 8h Outdoor	1.5E+4	2.8E+4	2.6E+4	2.0E+4	2.4E+4	1.1E+4	1.1E+4	2.0E+4	6.4E+3
Highest 8h Indoor	4.9E+2	6.9E+2	5.9E+2	5.6E+2	7.9E+2	2.9E+2	2.1E+2	5.2E+2	1.9E+2
Highest 8 h In/Out	0.03	0.03	0.02	0.03	0.03	0.03	0.02	0.03	0.00
Highest 1h Outdoor	1.5E+4	3.8E+4	3.5E+4	2.7E+4	4.5E+4	1.6E+4	1.5E+4	2.7E+4	1.1E+4
Highest 1 h Indoor ²	4.9E+2	6.9E+2	5.9E+2	5.6E+2	7.9E+2	2.9E+2	2.1E+2	7.2E+2	3.2E+2
Highest 1h In/Out	0.03	0.02	0.02	0.03	0.03	0.02	0.02	0.03	0.00
Time of highest 1h Outdoor	7/9/14 16:18	7/10/14 10:32	7/11/14 10:42	7/12/14 9:00	7/13/14 9:30	7/14/14 14:00	7/15/14 11:41		
Corresponding highest 1h Indoor	7/9/14 16:21	7/10/14 12:44	7/11/14 13:12	7/12/14 12:48	7/13/14 10:40	7/14/14 14:05	7/15/14 15:41		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 7/9/2014 20:00, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Table SU-6-D-3. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 100 nm to 2.5 micron measured using the TSI 3781 CPC with size selector.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	1.1E+3	7.8E+2	7.4E+2	1.2E+3	1.8E+3	1.6E+3	7.3E+2	1.1E+3	3.9E+2
Outdoor 24 SD	4.3E+2	5.0E+2	5.4E+2	1.1E+3	1.2E+3	9.2E+2	1.8E+2	6.9E+2	3.5E+2
Indoor 24h mean	4.1E+1	2.8E+1	2.3E+1	3.8E+1	5.9E+1	4.5E+1	2.4E+1	3.7E+1	1.2E+1
Indoor 24 SD	1.4E+1	1.8E+1	1.6E+1	3.2E+1	4.6E+1	2.3E+1	5.5E+0	2.2E+1	1.2E+1
24h mean In/Out	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.00
Highest 8h Outdoor	1.7E+3	1.4E+3	1.4E+3	2.4E+3	2.8E+3	2.6E+3	9.3E+2	1.9E+3	6.5E+2
Highest 8h Indoor	6.7E+1	5.0E+1	4.3E+1	7.4E+1	1.0E+2	7.0E+1	2.6E+1	6.2E+1	2.4E+1
Highest 8 h In/Out	0.04	0.04	0.03	0.03	0.04	0.03	0.03	0.03	0.00
Highest 1h Outdoor	1.7E+3	1.8E+3	1.8E+3	3.3E+3	3.5E+3	4.3E+3	1.1E+3	2.5E+3	1.1E+3
Highest 1 h Indoor ²	6.7E+1	5.0E+1	4.3E+1	7.4E+1	1.0E+2	7.0E+1	2.6E+1	9.1E+1	5.4E+1
Highest 1h In/Out	0.03	0.03	0.04	0.04	0.06	0.02	0.03	0.04	0.01
Time of highest 1h Outdoor	7/9/14 18:24	7/10/14 16:01	7/11/14 14:30	7/12/14 13:11	7/13/14 13:34	7/14/14 14:09	7/15/14 20:47		
Corresponding highest 1h Indoor	7/9/14 19:59	7/10/14 16:22	7/11/14 14:34	7/12/14 13:21	7/13/14 14:17	7/14/14 14:22	7/15/14 21:16		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 7/9/2014 20:00, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Table SU-6-D-4. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 6–100 nm based on difference between concentrations measured using the TSI 3787 CPC and the TSI 3781 CPC with size selector.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	9.6E+3	1.4E+4	1.4E+4	1.1E+4	1.2E+4	6.6E+3	5.9E+3	1.1E+4	3.1E+3
Outdoor 24 SD	2.5E+3	1.0E+4	9.3E+3	7.0E+3	9.9E+3	2.7E+3	4.2E+3	6.6E+3	3.2E+3
Indoor 24h mean	2.6E+2	3.3E+2	2.9E+2	2.7E+2	3.4E+2	1.5E+2	1.1E+2	2.5E+2	8.1E+1
Indoor 24 SD	6.6E+1	2.6E+2	2.3E+2	2.1E+2	3.2E+2	6.0E+1	6.6E+1	1.7E+2	1.0E+2
24h mean In/Out	0.03	0.02	0.02	0.02	0.03	0.03	0.02	0.02	0.00
Highest 8h Outdoor	1.4E+4	2.6E+4	2.5E+4	1.8E+4	2.2E+4	8.9E+3	1.0E+4	1.8E+4	6.5E+3
Highest 8h Indoor	4.2E+2	6.5E+2	5.5E+2	4.9E+2	6.9E+2	2.2E+2	1.9E+2	4.6E+2	1.8E+2
Highest 8 h In/Out	0.03	0.02	0.02	0.03	0.03	0.03	0.02	0.03	0.00
Highest 1h Outdoor	1.4E+4	3.7E+4	3.4E+4	2.6E+4	4.2E+4	1.2E+4	1.5E+4	2.6E+4	1.2E+4
Highest 1 h Indoor ²	4.2E+2	6.5E+2	5.5E+2	4.9E+2	6.9E+2	2.2E+2	1.9E+2	6.5E+2	3.1E+2
Highest 1h In/Out	0.03	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.00
Time of highest 1h Outdoor	7/9/14 16:18	7/10/14 10:32	7/11/14 10:42	7/12/14 9:00	7/13/14 9:30	7/14/14 14:00	7/15/14 11:41		
Corresponding highest 1h Indoor	7/9/14 16:21	7/10/14 12:44	7/11/14 13:12	7/12/14 12:45	7/13/14 10:40	7/14/14 14:06	7/15/14 15:41		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 7/9/2014 20:00, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Table SU-6-D-5. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 100–300 nm based on difference between concentrations measured using the TSI 3781 CPC with size selector and the MetOne BT637S OPC

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	1.1E+6	7.6E+5	7.4E+5	1.2E+6	1.8E+6	1.5E+6	7.1E+5	1.1E+6	3.9E+5
Outdoor 24 SD	4.3E+5	5.0E+5	5.4E+5	1.1E+6	1.2E+6	9.1E+5	1.8E+5	6.9E+5	3.5E+5
Indoor 24h mean	4.0E+4	2.8E+4	2.3E+4	3.8E+4	5.9E+4	4.4E+4	2.3E+4	3.6E+4	1.2E+4
Indoor 24 SD	1.4E+4	1.8E+4	1.6E+4	3.2E+4	4.6E+4	2.3E+4	5.4E+3	2.2E+4	1.2E+4
24h mean In/Out	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.00
Highest 8h Outdoor	1.6E+6	1.4E+6	1.4E+6	2.4E+6	2.8E+6	2.5E+6	9.0E+5	1.9E+6	6.4E+5
Highest 8h Indoor	6.6E+4	5.0E+4	4.3E+4	7.4E+4	1.0E+5	6.9E+4	2.5E+4	6.2E+4	2.4E+4
Highest 8 h In/Out	0.04	0.04	0.03	0.03	0.04	0.03	0.03	0.03	0.00
Highest 1h Outdoor	1.7E+6	1.8E+6	1.8E+6	3.3E+6	3.5E+6	4.2E+6	1.0E+6	2.5E+6	1.1E+6
Highest 1 h Indoor ²	6.6E+4	5.0E+4	4.3E+4	7.4E+4	1.0E+5	6.9E+4	2.5E+4	9.0E+4	5.4E+4
Highest 1h In/Out	0.03	0.03	0.04	0.04	0.06	0.02	0.03	0.04	0.01
Time of highest 1h Outdoor	7/9/14 18:25	7/10/14 16:01	7/11/14 14:30	7/12/14 13:11	7/13/14 13:34	7/14/14 14:09	7/15/14 20:47		
Corresponding highest 1h Indoor	7/9/14 19:59	7/10/14 16:22	7/11/14 14:34	7/12/14 13:21	7/13/14 14:17	7/14/14 14:22	7/15/14 21:21		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 7/9/2014 20:00, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Table SU-6-D-6. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.3–0.4 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	1.3E+4	1.1E+4	6.3E+3	1.0E+4	1.7E+4	2.2E+4	1.7E+4	1.4E+4	4.9E+3
Outdoor 24 SD	3.2E+3	5.4E+3	2.0E+3	5.7E+3	3.5E+3	1.1E+4	3.9E+3	4.9E+3	2.7E+3
Indoor 24h mean	3.9E+2	3.4E+2	1.8E+2	2.7E+2	4.3E+2	6.1E+2	5.1E+2	3.9E+2	1.3E+2
Indoor 24 SD	1.3E+2	1.6E+2	5.2E+1	1.4E+2	1.7E+2	2.6E+2	1.4E+2	1.5E+2	5.6E+1
24h mean In/Out	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.00
Highest 8h Outdoor	1.4E+4	1.7E+4	8.3E+3	1.4E+4	1.9E+4	3.6E+4	2.2E+4	1.9E+4	8.1E+3
Highest 8h Indoor	3.9E+2	4.8E+2	2.0E+2	3.7E+2	5.3E+2	8.9E+2	5.0E+2	4.8E+2	2.0E+2
Highest 8 h In/Out	0.03	0.03	0.02	0.03	0.03	0.02	0.02	0.03	0.00
Highest 1h Outdoor	1.8E+4	2.0E+4	1.2E+4	2.1E+4	2.4E+4	4.7E+4	2.4E+4	2.4E+4	1.0E+4
Highest 1 h Indoor ²	3.9E+2	4.8E+2	2.0E+2	3.7E+2	5.3E+2	8.9E+2	5.0E+2	5.9E+2	2.0E+2
Highest 1h In/Out	0.03	0.03	0.02	0.03	0.02	0.02	0.02	0.03	0.00
Time of highest 1h Outdoor	7/10/14 1:05	7/10/14 6:37	7/11/14 19:58	7/12/14 13:25	7/13/14 19:31	7/14/14 14:51	7/15/14 20:04		
Corresponding highest 1h Indoor	7/10/14 1:45	7/10/14 7:03	7/11/14 21:06	7/12/14 14:02	7/13/14 22:09	7/14/14 15:17	7/15/14 21:11		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 7/9/2014 20:00, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Table SU-6-D-7. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.4–0.5 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	1.6E+3	1.5E+3	8.6E+2	1.3E+3	2.1E+3	3.0E+3	2.2E+3	1.8E+3	6.6E+2
Outdoor 24 SD	3.5E+2	7.6E+2	3.4E+2	7.4E+2	5.7E+2	9.1E+2	3.8E+2	5.8E+2	2.1E+2
Indoor 24h mean	4.7E+1	4.2E+1	2.7E+1	3.6E+1	5.1E+1	7.8E+1	6.2E+1	4.9E+1	1.6E+1
Indoor 24 SD	1.3E+1	1.8E+1	8.8E+0	1.6E+1	2.0E+1	2.4E+1	2.0E+1	1.7E+1	4.8E+0
24h mean In/Out	0.03	0.03	0.03	0.03	0.03	0.02	0.03	0.03	0.00
Highest 8h Outdoor	2.0E+3	2.4E+3	1.2E+3	1.7E+3	2.5E+3	3.9E+3	2.6E+3	2.3E+3	7.9E+2
Highest 8h Indoor	5.4E+1	5.7E+1	3.0E+1	4.6E+1	6.5E+1	9.4E+1	7.2E+1	6.0E+1	1.9E+1
Highest 8 h In/Out	0.03	0.02	0.03	0.03	0.03	0.02	0.03	0.03	0.00
Highest 1h Outdoor	2.0E+3	3.0E+3	1.8E+3	2.6E+3	3.0E+3	4.6E+3	2.8E+3	2.8E+3	8.5E+2
Highest 1 h Indoor ²	5.4E+1	5.7E+1	3.0E+1	4.6E+1	6.5E+1	9.4E+1	7.2E+1	7.0E+1	1.8E+1
Highest 1h In/Out	0.03	0.02	0.03	0.03	0.03	0.02	0.02	0.02	0.00
Time of highest 1h Outdoor	7/10/14 0:58	7/10/14 8:08	7/11/14 20:00	7/12/14 22:59	7/13/14 21:51	7/14/14 13:34	7/15/14 20:47		
Corresponding highest 1h Indoor	7/10/14 1:53	7/10/14 11:56	7/11/14 21:06	7/13/14 2:35	7/14/14 0:16	7/14/14 13:34	7/15/14 21:07		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 7/9/2014 20:00, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Table SU-6-D-8. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.5–0.7 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	8.2E+2	6.9E+2	4.9E+2	7.2E+2	1.3E+3	2.5E+3	1.5E+3	1.2E+3	6.5E+2
Outdoor 24 SD	1.5E+2	2.5E+2	1.9E+2	3.1E+2	6.5E+2	5.8E+2	4.0E+2	3.6E+2	1.8E+2
Indoor 24h mean	2.3E+1	2.0E+1	1.6E+1	2.1E+1	3.0E+1	5.8E+1	3.9E+1	2.9E+1	1.4E+1
Indoor 24 SD	5.6E+0	6.9E+0	6.8E+0	9.1E+0	1.4E+1	2.4E+1	2.0E+1	1.2E+1	6.6E+0
24h mean In/Out	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.03	0.00
Highest 8h Outdoor	1.1E+3	9.8E+2	6.5E+2	8.7E+2	2.0E+3	3.0E+3	2.4E+3	1.6E+3	8.5E+2
Highest 8h Indoor	2.5E+1	2.4E+1	1.7E+1	2.4E+1	5.4E+1	7.2E+1	6.0E+1	4.0E+1	2.0E+1
Highest 8 h In/Out	0.02	0.02	0.03	0.03	0.03	0.02	0.02	0.03	0.00
Highest 1h Outdoor	1.1E+3	1.2E+3	9.4E+2	1.3E+3	2.6E+3	3.3E+3	2.2E+3	1.8E+3	8.5E+2
Highest 1 h Indoor ²	2.5E+1	2.4E+1	1.7E+1	2.4E+1	5.4E+1	7.2E+1	6.0E+1	4.4E+1	1.9E+1
Highest 1h In/Out	0.02	0.02	0.03	0.03	0.03	0.02	0.02	0.02	0.00
Time of highest 1h Outdoor	7/9/14 17:45	7/10/14 8:13	7/11/14 20:07	7/12/14 22:59	7/14/14 2:00	7/14/14 9:10	7/15/14 2:00		
Corresponding highest 1h Indoor	7/9/14 17:45	7/10/14 11:58	7/11/14 21:07	7/13/14 2:35	7/14/14 4:49	7/14/14 12:23	7/15/14 3:50		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 7/9/2014 20:00, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Table SU-6-D-9. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.7–1.0 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	2.4E+2	1.9E+2	1.5E+2	2.2E+2	5.0E+2	1.1E+3	6.1E+2	4.3E+2	3.2E+2
Outdoor 24 SD	3.8E+1	4.1E+1	3.3E+1	4.9E+1	3.1E+2	3.6E+2	2.3E+2	1.5E+2	1.3E+2
Indoor 24h mean	6.2E+0	5.2E+0	5.2E+0	6.6E+0	9.7E+0	2.2E+1	1.3E+1	9.7E+0	5.7E+0
Indoor 24 SD	2.1E+0	2.0E+0	3.7E+0	3.9E+0	5.4E+0	1.1E+1	8.7E+0	5.3E+0	3.2E+0
24h mean In/Out	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.03	0.00
Highest 8h Outdoor	2.7E+2	2.4E+2	1.8E+2	2.4E+2	7.9E+2	1.5E+3	1.1E+3	6.2E+2	4.9E+2
Highest 8h Indoor	6.5E+0	6.5E+0	4.9E+0	7.3E+0	2.1E+1	2.9E+1	2.4E+1	1.4E+1	9.4E+0
Highest 8 h In/Out	0.02	0.03	0.03	0.03	0.03	0.02	0.02	0.03	0.00
Highest 1h Outdoor	2.8E+2	2.7E+2	2.1E+2	2.9E+2	1.3E+3	1.6E+3	1.1E+3	7.1E+2	5.4E+2
Highest 1 h Indoor ²	6.5E+0	6.5E+0	4.9E+0	7.3E+0	2.1E+1	2.9E+1	2.4E+1	1.6E+1	9.9E+0
Highest 1h In/Out	0.03	0.02	0.03	0.05	0.02	0.02	0.02	0.03	0.01
Time of highest 1h Outdoor	7/9/14 22:40	7/10/14 8:51	7/11/14 20:07	7/12/14 23:03	7/14/14 2:00	7/14/14 8:41	7/15/14 2:00		
Corresponding highest 1h Indoor	7/9/14 23:40	7/10/14 10:10	7/11/14 21:34	7/13/14 2:32	7/14/14 4:49	7/14/14 8:41	7/15/14 3:50		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 7/9/2014 20:00, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Table SU-6-D-10. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 1.0–2.5 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	2.0E+2	1.6E+2	1.4E+2	1.9E+2	3.9E+2	9.5E+2	5.3E+2	3.7E+2	2.7E+2
Outdoor 24 SD	3.3E+1	3.9E+1	4.3E+1	4.6E+1	2.3E+2	2.8E+2	1.8E+2	1.2E+2	9.8E+1
Indoor 24h mean	4.0E+0	3.1E+0	5.0E+0	5.9E+0	5.9E+0	1.4E+1	9.3E+0	6.8E+0	3.5E+0
Indoor 24 SD	1.9E+0	1.5E+0	7.7E+0	6.4E+0	3.2E+0	9.3E+0	9.8E+0	5.7E+0	3.2E+0
24h mean In/Out	0.02	0.02	0.03	0.03	0.02	0.01	0.02	0.02	0.01
Highest 8h Outdoor	2.3E+2	2.0E+2	1.9E+2	2.3E+2	6.3E+2	1.2E+3	9.7E+2	5.2E+2	3.9E+2
Highest 8h Indoor	5.3E+0	3.8E+0	3.3E+0	5.4E+0	1.2E+1	1.9E+1	1.5E+1	9.1E+0	5.7E+0
Highest 8 h In/Out	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.00
Highest 1h Outdoor	2.3E+2	2.2E+2	2.1E+2	2.7E+2	9.7E+2	1.4E+3	8.4E+2	5.8E+2	4.3E+2
Highest 1 h Indoor ²	5.3E+0	3.8E+0	3.3E+0	5.4E+0	1.2E+1	1.9E+1	1.5E+1	9.3E+0	6.4E+0
Highest 1h In/Out	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.00
Time of highest 1h Outdoor	7/9/14 17:30	7/10/14 12:30	7/11/14 18:48	7/12/14 20:34	7/14/14 2:00	7/14/14 8:51	7/15/14 2:00		
Corresponding highest 1h Indoor	7/9/14 17:30	7/10/14 13:13	7/11/14 21:27	7/13/14 0:34	7/14/14 2:50	7/14/14 8:51	7/15/14 3:48		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 7/9/2014 20:00, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Table SU-6-D-11. Summary statistics for estimated PM_{2.5} concentrations (µg m⁻³) calculated from particle number concentrations resolved by size from 6 nm to 2.5 microns (as reported in Tables SU-6-D-2 to SU-6-D-9) and resulting indoor/outdoor ratios.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	7.8E+0	6.9E+0	6.3E+0	8.3E+0	1.3E+1	1.5E+1	8.6E+0	9.4E+0	3.0E+0
Outdoor 24 SD	1.9E+0	3.1E+0	3.1E+0	4.9E+0	5.3E+0	4.1E+0	1.9E+0	3.5E+0	1.3E+0
Indoor 24h mean	2.5E-1	2.0E-1	1.8E-1	2.4E-1	3.5E-1	3.4E-1	2.1E-1	2.5E-1	6.2E-2
Indoor 24 SD	6.3E-2	9.9E-2	9.1E-2	1.5E-1	2.3E-1	1.2E-1	8.9E-2	1.2E-1	5.0E-2
24h mean In/Out	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.03	0.00
Highest 8h Outdoor	1.1E+1	1.1E+1	9.8E+0	1.4E+1	1.6E+1	2.0E+1	1.2E+1	1.3E+1	3.4E+0
Highest 8h Indoor	4.4E-1	3.2E-1	2.6E-1	4.0E-1	5.7E-1	4.6E-1	2.7E-1	3.9E-1	1.0E-1
Highest 8 h In/Out	0.04	0.03	0.03	0.03	0.03	0.02	0.02	0.03	0.01
Highest 1h Outdoor	1.1E+1	1.2E+1	1.1E+1	1.8E+1	2.0E+1	2.7E+1	1.1E+1	1.6E+1	5.7E+0
Highest 1 h Indoor ²	4.4E-1	3.2E-1	2.6E-1	4.0E-1	5.7E-1	4.6E-1	2.7E-1	4.7E-1	1.6E-1
Highest 1h In/Out	0.04	0.03	0.03	0.04	0.03	0.02	0.02	0.03	0.01
Time of highest 1h Outdoor	7/9/14 16:18	7/10/14 11:23	7/11/14 14:21	7/12/14 13:11	7/13/14 9:34	7/14/14 13:58	7/15/14 20:02		
Corresponding highest 1h Indoor	7/9/14 16:22	7/10/14 14:17	7/11/14 14:23	7/12/14 13:20	7/13/14 13:34	7/14/14 14:00	7/15/14 21:10		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 7/9/2014 20:00, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Table SU-6-D-12. Summary statistics for concentrations of PM_{2.5} (µg m⁻³) and indoor /outdoor ratios from measurements reported by TSI DustTrak II.

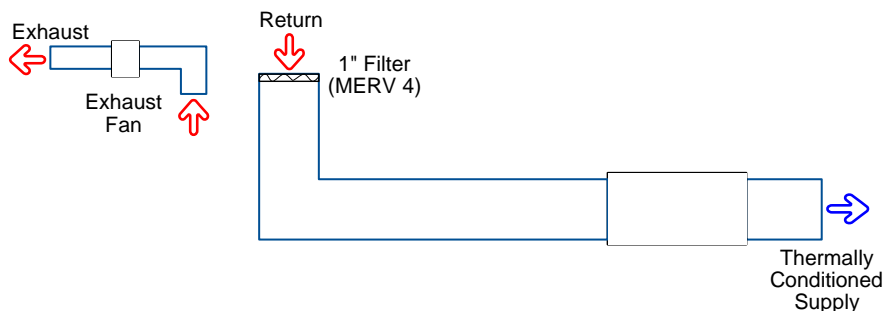
Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	9.9E-3	4.5E-3	1.8E-3	6.3E-3	9.8E-3	1.7E-2	1.1E-2	8.7E-3	4.6E-3
Outdoor 24 SD	2.0E-3	1.7E-3	8.9E-4	4.6E-3	1.9E-3	7.7E-3	2.9E-3	3.1E-3	2.2E-3
Indoor 24h mean	2.9E-3	1.0E-3	1.0E-3	1.2E-3	1.2E-3	1.8E-3	1.8E-3	1.6E-3	6.3E-4
Indoor 24 SD	1.1E-3	3.3E-17	3.3E-17	4.9E-4	5.0E-4	9.2E-4	1.1E-3	5.9E-4	4.4E-4
24h mean In/Out	0.28	0.25	0.39	0.33	0.15	0.11	0.13	0.24	0.10
Highest 8h Outdoor	1.3E-2	9.2E-3	2.6E-3	1.1E-2	1.1E-2	2.7E-2	1.5E-2	1.3E-2	6.8E-3
Highest 8h Indoor	3.3E-3	2.9E-3	1.0E-3	1.6E-3	1.6E-3	2.5E-3	3.0E-3	2.3E-3	7.9E-4
Highest 8 h In/Out	0.25	0.31	0.39	0.15	0.15	0.09	0.21	0.22	0.10
Highest 1h Outdoor	1.3E-2	6.7E-3	4.2E-3	1.8E-2	1.3E-2	3.4E-2	1.6E-2	1.5E-2	9.0E-3
Highest 1 h Indoor ²	3.3E-3	2.9E-3	1.0E-3	1.6E-3	1.6E-3	2.5E-3	3.0E-3	2.3E-3	8.5E-4
Highest 1h In/Out	0.25	0.15	0.24	0.16	0.23	0.07	0.14	0.18	0.06
Time of highest 1h Outdoor	7/9/14 17:02	7/10/14 16:02	7/11/14 13:57	7/12/14 13:30	7/13/14 14:22	7/14/14 14:39	7/15/14 15:18		
Corresponding highest 1h Indoor	7/9/14 17:02	7/10/14 16:02	7/11/14 13:57	7/12/14 14:18	7/13/14 14:22	7/14/14 14:39	7/15/14 15:18		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 7/9/2014 20:00, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Table SU-6-D-13. Daily¹ summary statistics for concentrations (nanograms m⁻³) and indoor /outdoor ratios of aerosol black carbon measured using the Aethalometer AE22.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	2.3E+2	2.0E+2	1.8E+2	2.2E+2	2.7E+2	6.5E+2	2.7E+2	2.9E+2	1.5E+2
Outdoor 24 SD	9.9E+1	9.5E+1	7.4E+1	1.2E+2	1.5E+2	4.7E+2	9.9E+1	1.6E+2	1.3E+2
Indoor 24h mean	1.6E+1	1.7E+1	1.8E+1	1.8E+1	1.9E+1	2.9E+1	1.9E+1	2.0E+1	4.2E+0
Indoor 24 SD	3.5E+0	9.2E+0	1.1E+1	1.1E+1	1.7E+1	2.8E+1	1.3E+1	1.3E+1	7.0E+0
24h mean In/Out	0.06	0.07	0.09	0.10	0.08	0.05	0.06	0.07	0.02
Highest 8h Outdoor	4.6E+2	2.9E+2	2.3E+2	3.2E+2	4.0E+2	1.1E+3	3.2E+2	4.5E+2	2.8E+2
Highest 8h Indoor	1.8E+1	1.9E+1	2.2E+1	2.2E+1	1.9E+1	5.0E+1	2.0E+1	2.4E+1	1.1E+1
Highest 8 h In/Out	0.04	0.07	0.10	0.07	0.05	0.05	0.06	0.06	0.02
Highest 1h Outdoor	4.6E+2	3.3E+2	2.9E+2	5.0E+2	6.1E+2	1.9E+3	3.7E+2	6.4E+2	5.3E+2
Highest 1 h Indoor ²	1.8E+1	1.9E+1	2.2E+1	2.2E+1	1.9E+1	5.0E+1	2.0E+1	3.1E+1	2.2E+1
Highest 1h In/Out	0.04	0.05	0.06	0.08	0.04	0.04	0.05	0.05	0.01
Time of highest 1h Outdoor	7/9/14 16:06	7/10/14 9:45	7/11/14 7:24	7/12/14 13:15	7/13/14 23:24	7/14/14 11:42	7/15/14 21:27		
Corresponding highest 1h Indoor	7/9/14 19:09	7/10/14 11:57	7/11/14 7:36	7/12/14 15:42	7/13/14 23:54	7/14/14 11:42	7/16/14 0:57		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 7/9/2014 20:00, and has < 24h of data.²Occurring within 4h of highest 1h outdoor concentration.

Appendix SU-7-R. Results for Reference System, July 16-23, 2014.**Table SU-7-R-1.** Description of **Reference System** component characteristics during the period of **July 16-23, 2014**

System Parameter	Description or Measured Value
Heating	75,000 BTU/h, 80% eff., gas furnace, 1-stage burner
Cooling	3 ton, SEER13 air conditioner
Thermal distribution	Central fan with PSC motor: 1200 cfm for cooling, 1074 cfm for heating
Ventilation	Exhaust fan in main bathroom with ECM; Set to 38 cfm continuous
Filtration	MERV4, 1" (Purolator F312) filter installed at return air ceiling grill of forced air furnace. Some particle removal as air infiltrates through building envelope to replace air exiting home through continuous exhaust fan in bathroom.
Recirculation blower schedule	As required for thermal conditioning, no fan cyclers.
VOC removal system	None

Notes about this monitoring period

There were no major instrument problems for this operational period. The DustTrak instruments were running out of signal.

The 24 h running statistics in the figures starts at 7/16/2014 22:15. Data from 7/21/2014 06:00 on was censored from the largest Met1 channel due to indoor activity associated with changing sorbent tubes.

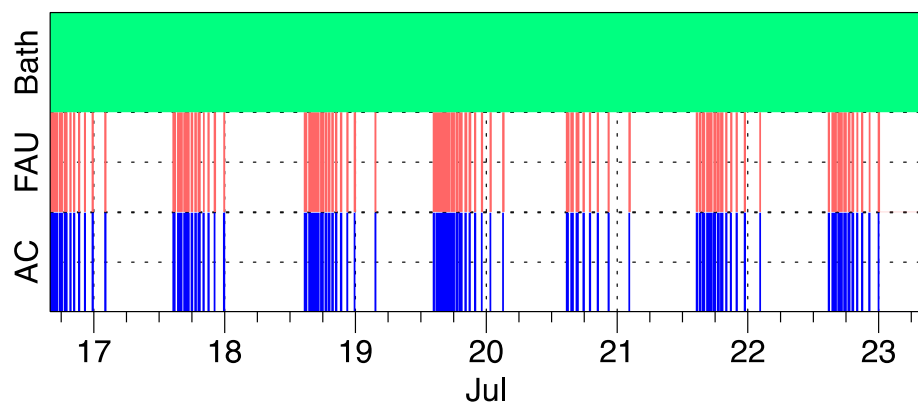


Figure SU-7-R-1. Operation of mechanical systems: Bath exhaust fan; fan on central forced air unit (FAU); central air-conditioning (AC).

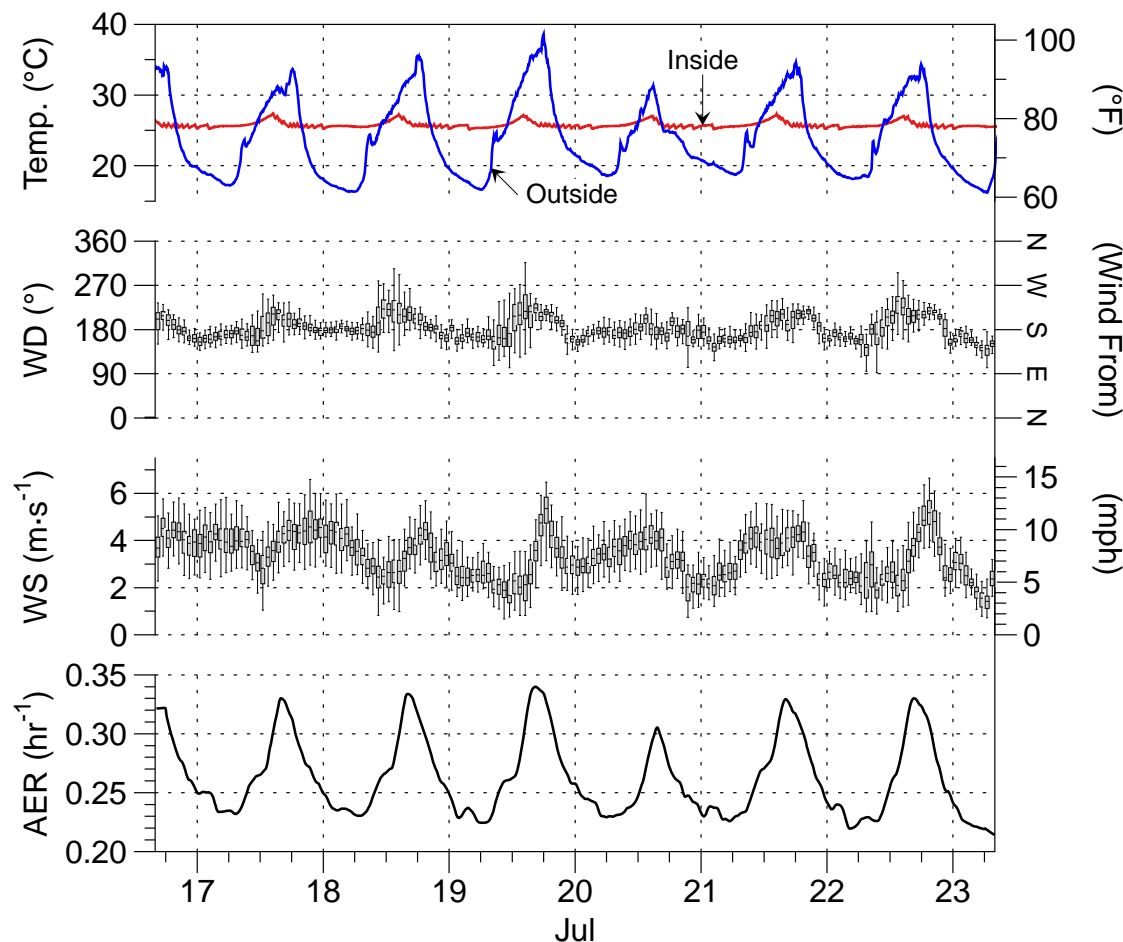


Figure SU-7-R-2. Environmental parameters measured during operation of Reference System, July 16-23, 2014. From top to bottom: indoor and outdoor temperatures, wind direction (WD) in units of degrees from North, wind speed (WS), and air exchange rate (AER). For WD and WS, the box for each hour shows the 25th, 50th and 75th percentiles of the measured values and whiskers extend 1.5X the interquartile range (75th–25th percentile values) above the 75th and below the 25th percentile values.

Guide to plots of pollutant concentration time series and indoor / outdoor (I/O) ratios

The bottom section of each plot shows outdoor and indoor time series using the resolution of data collection: 3-min for black carbon and 1-min for all other parameters. The top and bottom of grey band are LOESS-smoothed, 1-min (or 3-min for black carbon) time-series. Also shown are time series with 1h and 24h time averaging for most pollutants and 1h and 8h average for ozone. Triangles in bottom of plot indicate the highest 1h outdoor and corresponding highest 1h indoor average during each day. The top section of each plot shows the ratio of indoor to outdoor running 24h mean values (8h for ozone) and the ratios of highest 1h indoor to corresponding highest 1h outdoor concentration each day.

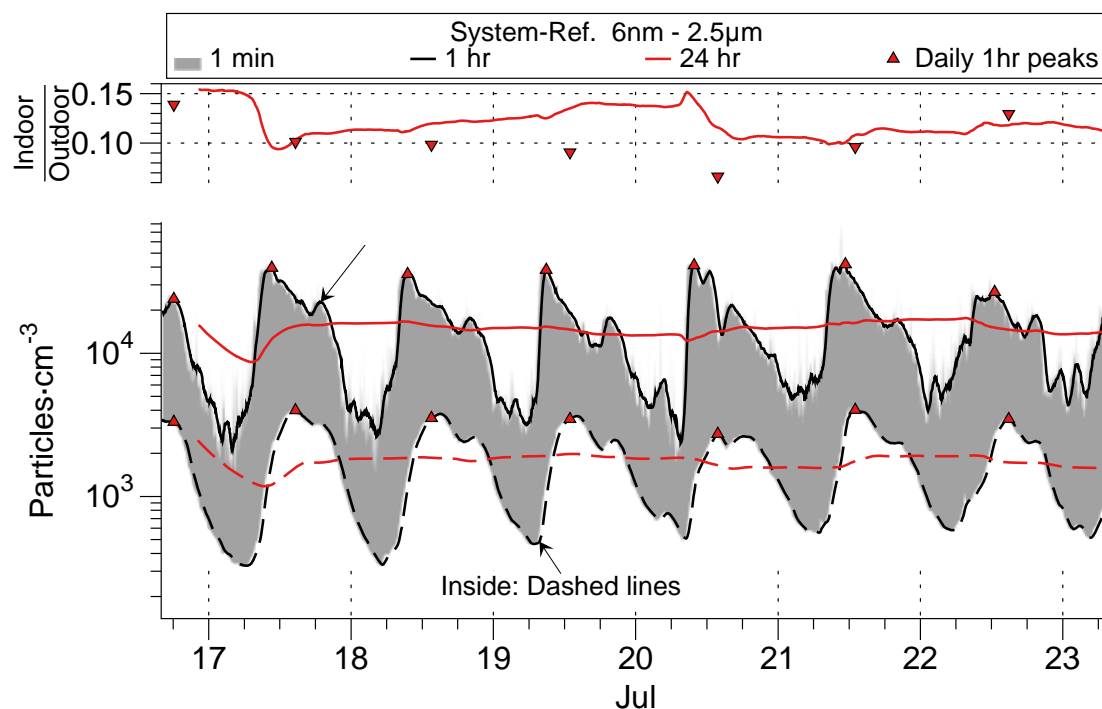


Figure SU-7-R-3. Number concentrations of 6 nm to 2.5 μm diameter particles measured outdoors and indoors during operation of Reference System, July 16-23, 2014. Data collected using TSI 3787 CPCs.

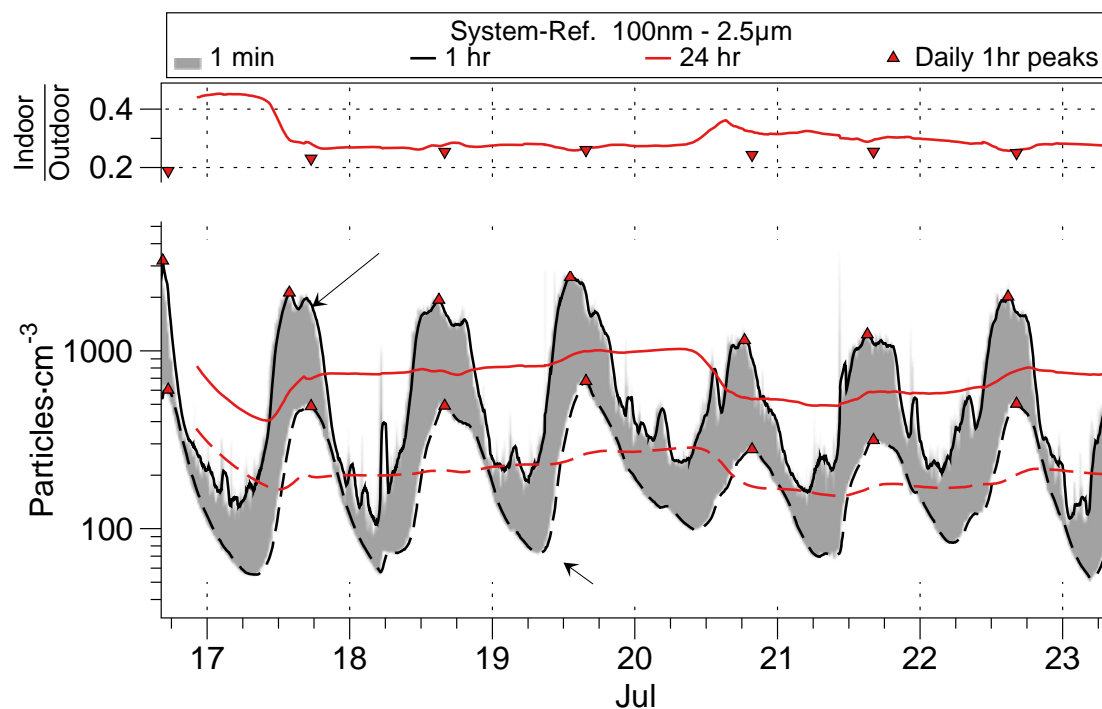


Figure SU-7-R-4. Number concentrations of 100 nm to 2.5 μm diameter particles measured outdoors and indoors during operation of Reference System, July 16-23, 2014. Data collected using TSI 3781 CPCs outfitted with screens to exclude particles smaller than 100 nm. Refer to “Guide” before Figure SU-7-R-3.

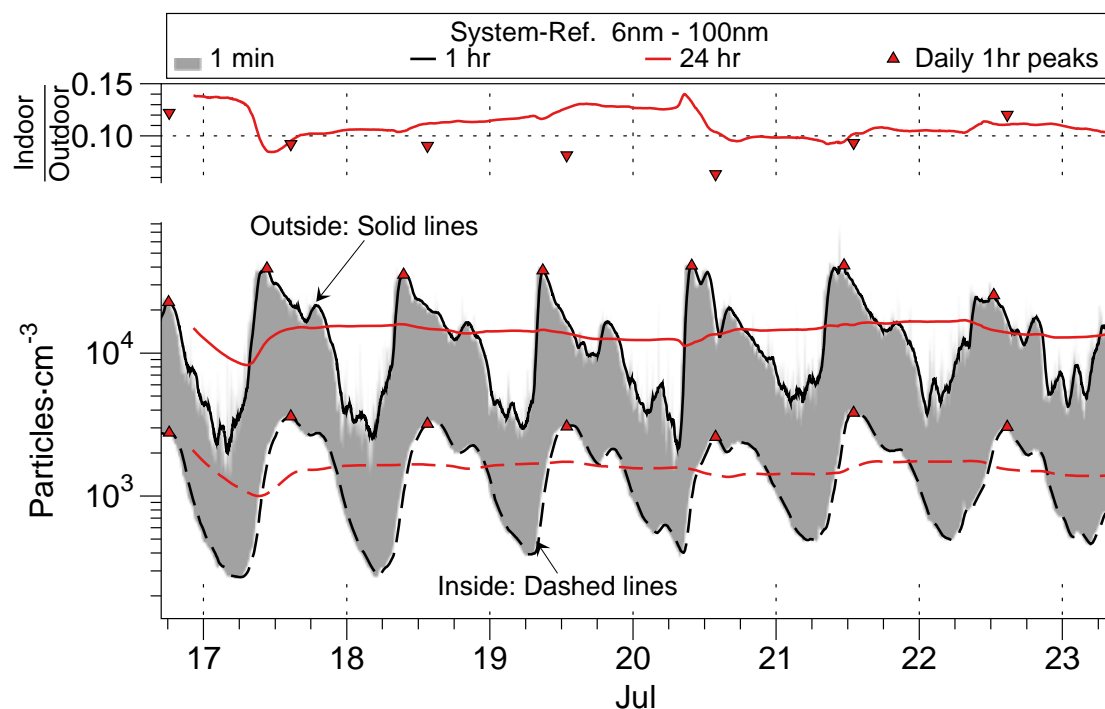


Figure SU-7-R-5. Number concentrations of 6–100 nm diameter particles measured outdoors and indoors during operation of Reference System, July 16-23, 2014. Data obtained as the difference between time series show in prior two figures. Refer to “Guide” before Figure SU-7-R-3.

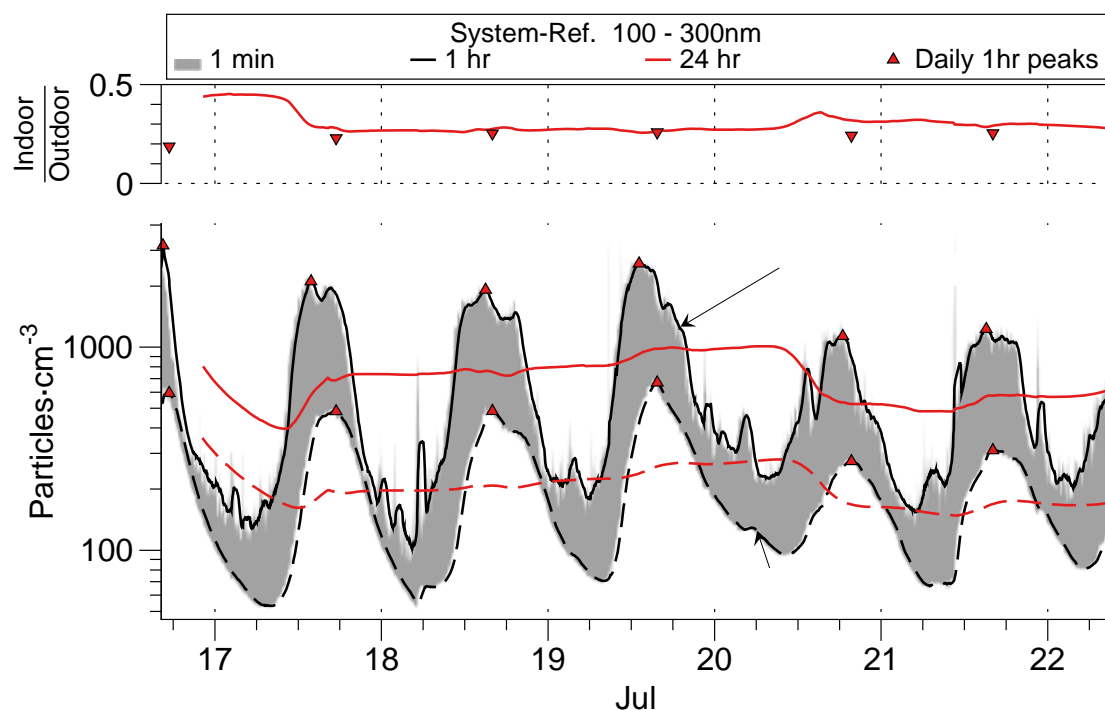


Figure SU-7-R-6. Number concentrations of 100–300 nm diameter particles measured outdoors and indoors during operation of Reference System, July 16-23, 2014. Data obtained as the difference between the TSI 3781 CPC with size selector and the MetOne BT637S OPC. Refer to “Guide” before Figure SU-7-R-3.

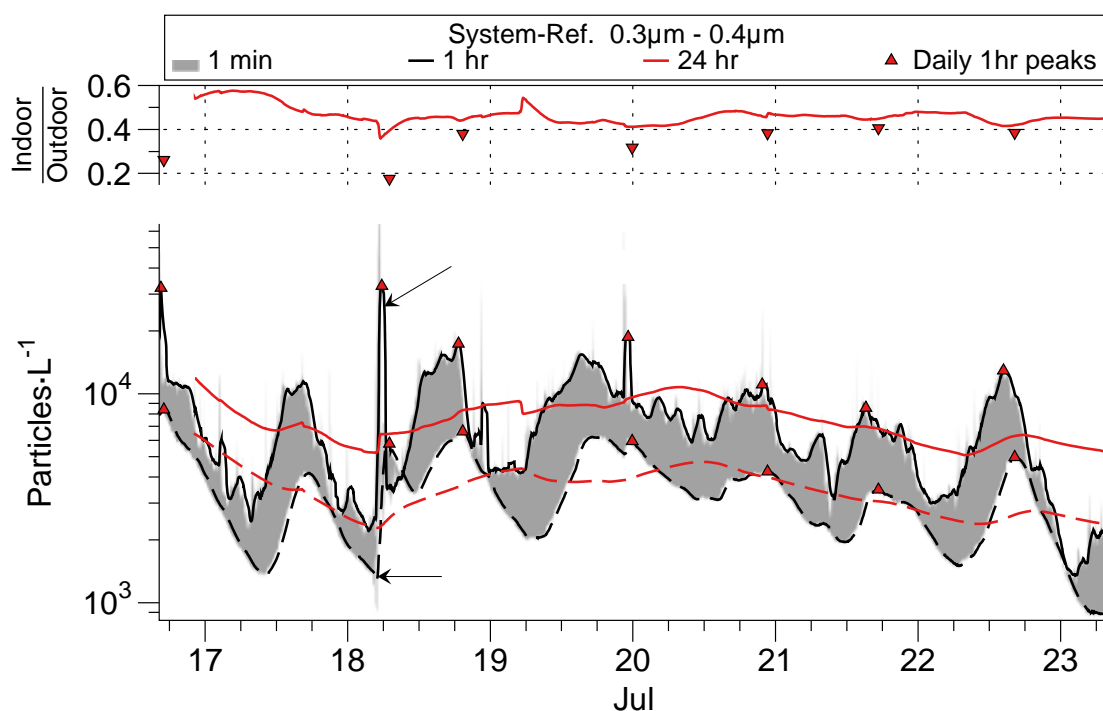


Figure SU-7-R-7. Number concentrations of 0.3–0.4 μm diameter particles measured outdoors and indoors during operation of Reference System, July 16-23, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-7-R-3.

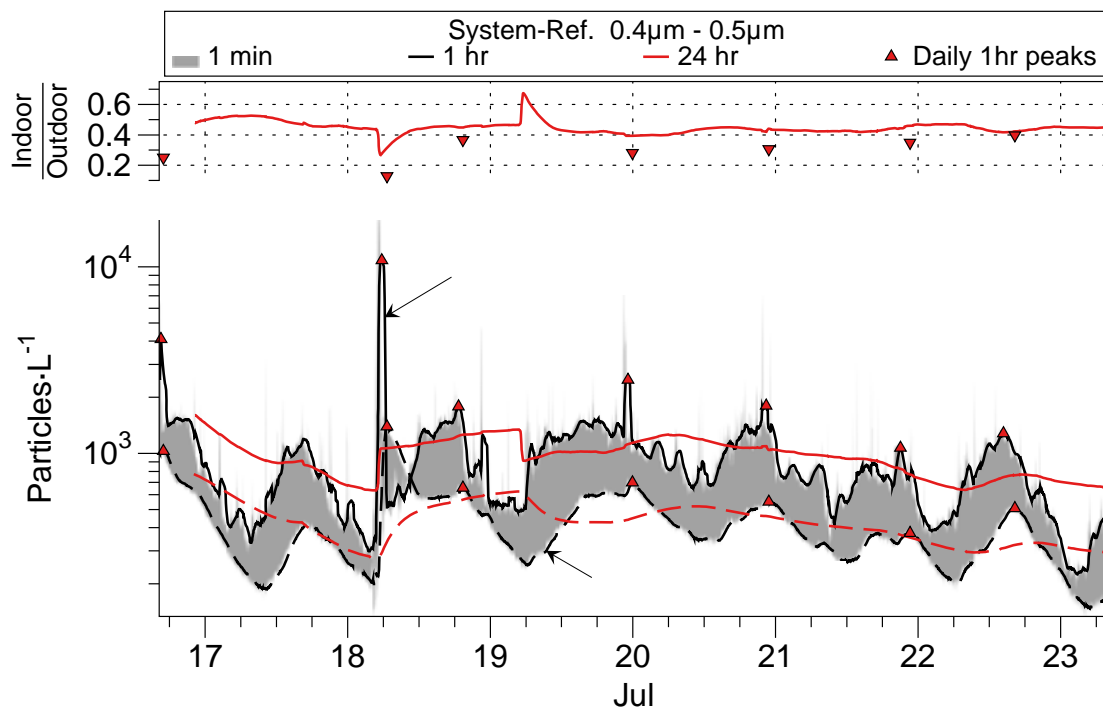


Figure SU-7-R-8. Number concentrations of 0.4–0.5 μm diameter particles measured outdoors and indoors during operation of Reference System, July 16-23, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-7-R-3.

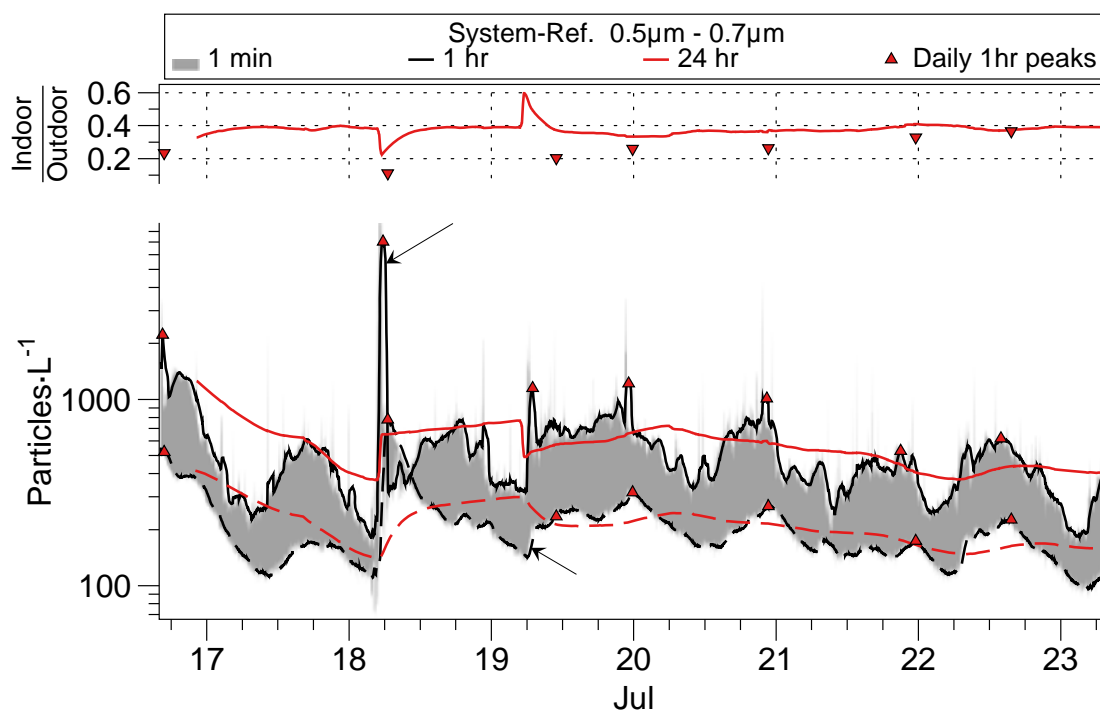


Figure SU-7-R-9. Number concentrations of 0.5–0.7 μm diameter particles measured outdoors and indoors during operation of Reference System, July 16-23, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-7-R-3.

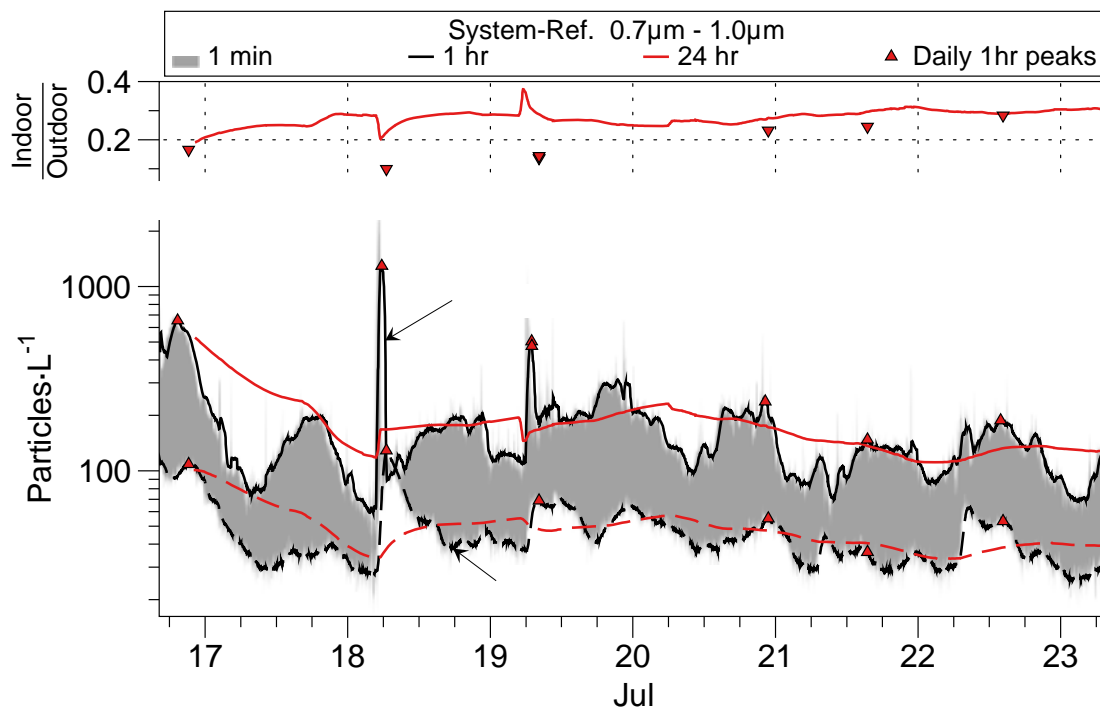


Figure SU-7-R-10. Number concentrations of 0.7–1.0 μm diameter particles measured outdoors and indoors during operation of Reference System, July 16-23, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-7-R-3.

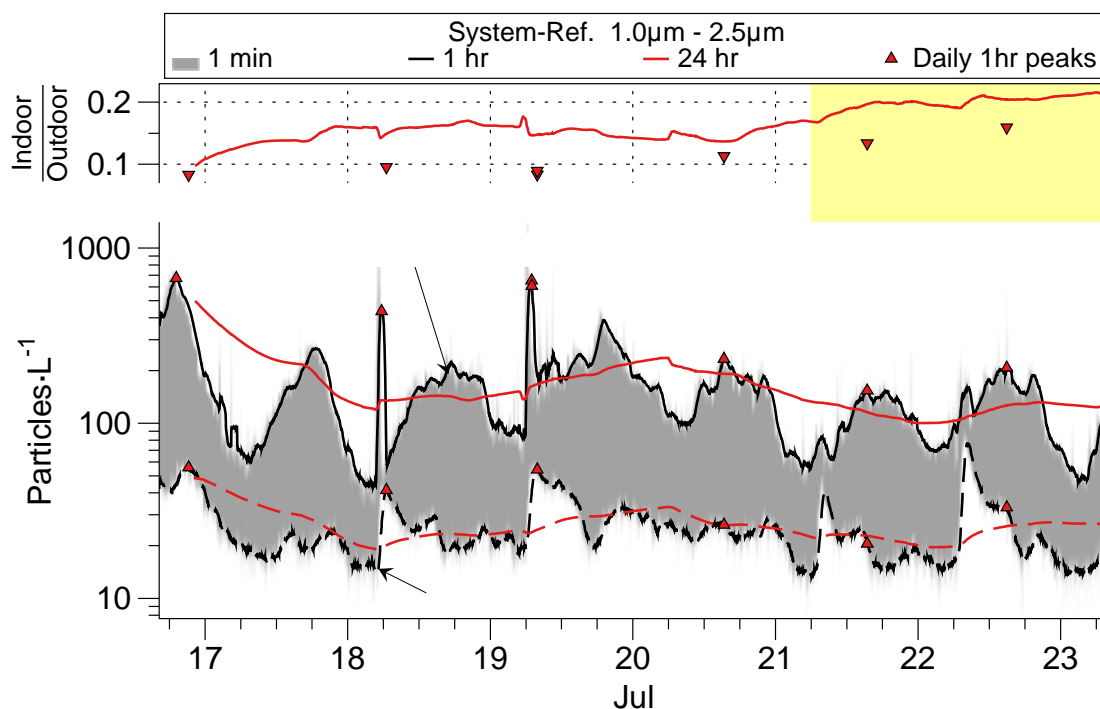


Figure SU-7-R-11. Number concentrations of 1.0–2.5 μm diameter particles measured outdoors and indoors during operation of Reference System, July 16-23, 2014. Data collected using MetOne BT637S particle counters. Refer to Figure SU-7-R-3 for details. The yellow band indicates censored data due to in house activity.

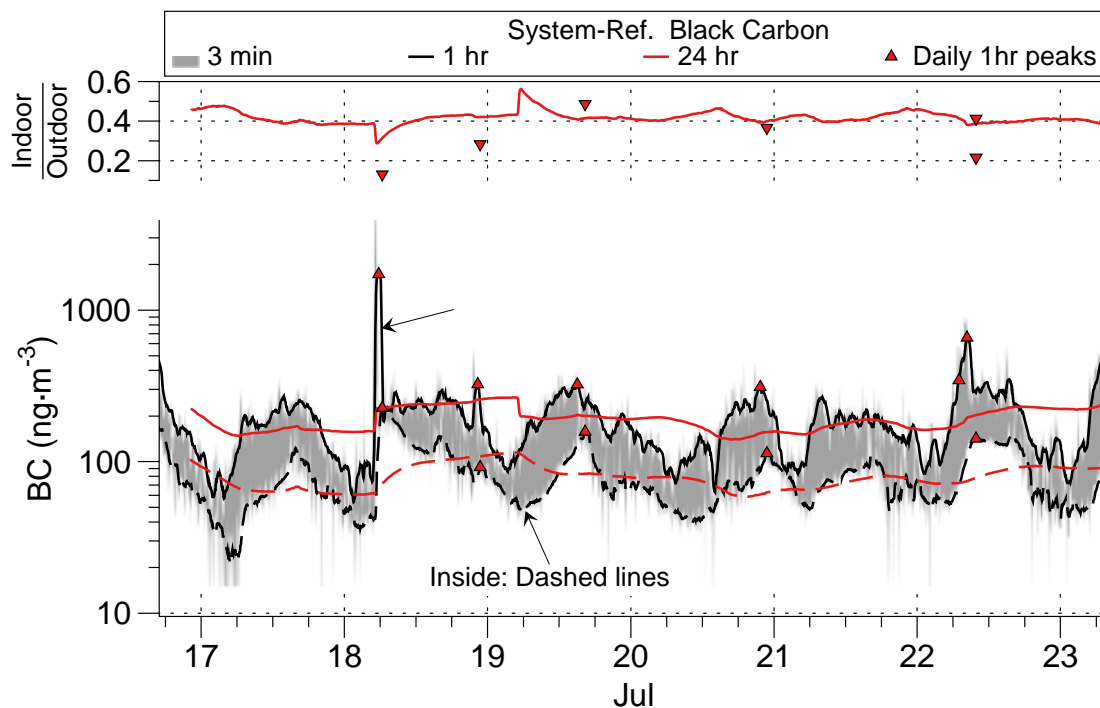


Figure SU-7-R-12. Black carbon concentrations measured outdoors and indoors during operation of Reference System, July 16-23, 2014. Data collected using AE22 Aethalometers with 3-min samples. Data otherwise as described in Figure SU-7-R-3 caption.

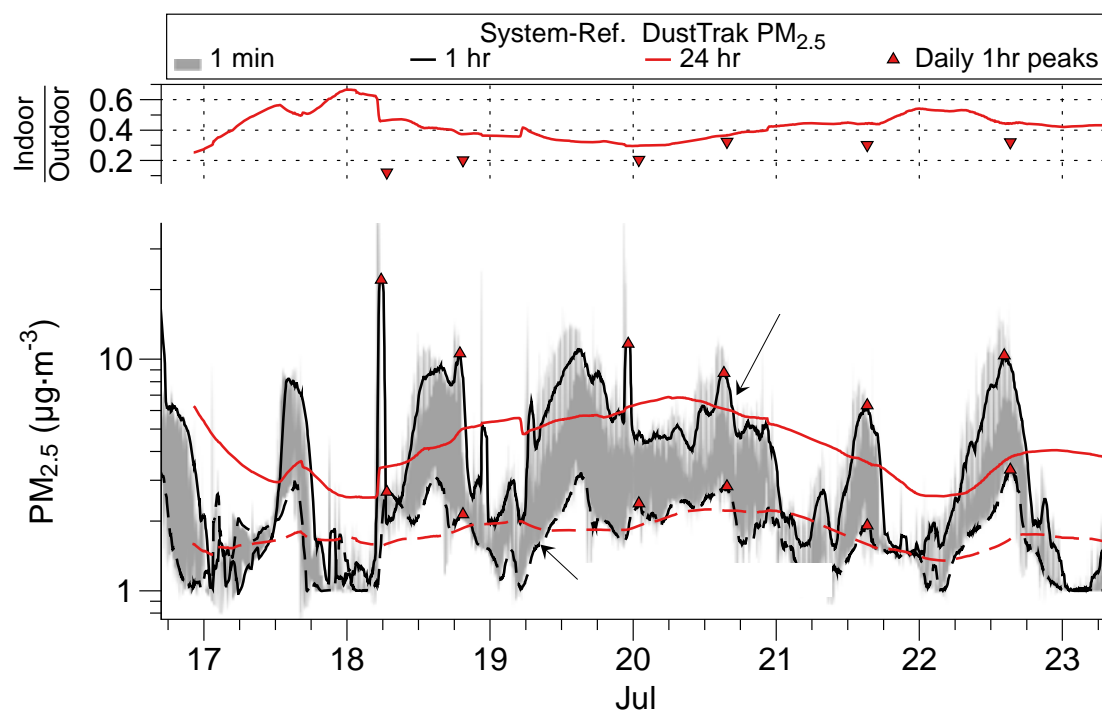


Figure SU-7-R-13. PM_{2.5} reported by TSI DustTrak II 8530 measurements outdoors and indoors during operation of Reference System, July 16-23, 2014. The DustTrak measures light scattering and uses a calibration to estimate PM_{2.5} mass. Refer to “Guide” before Figure SU-7-R-3.

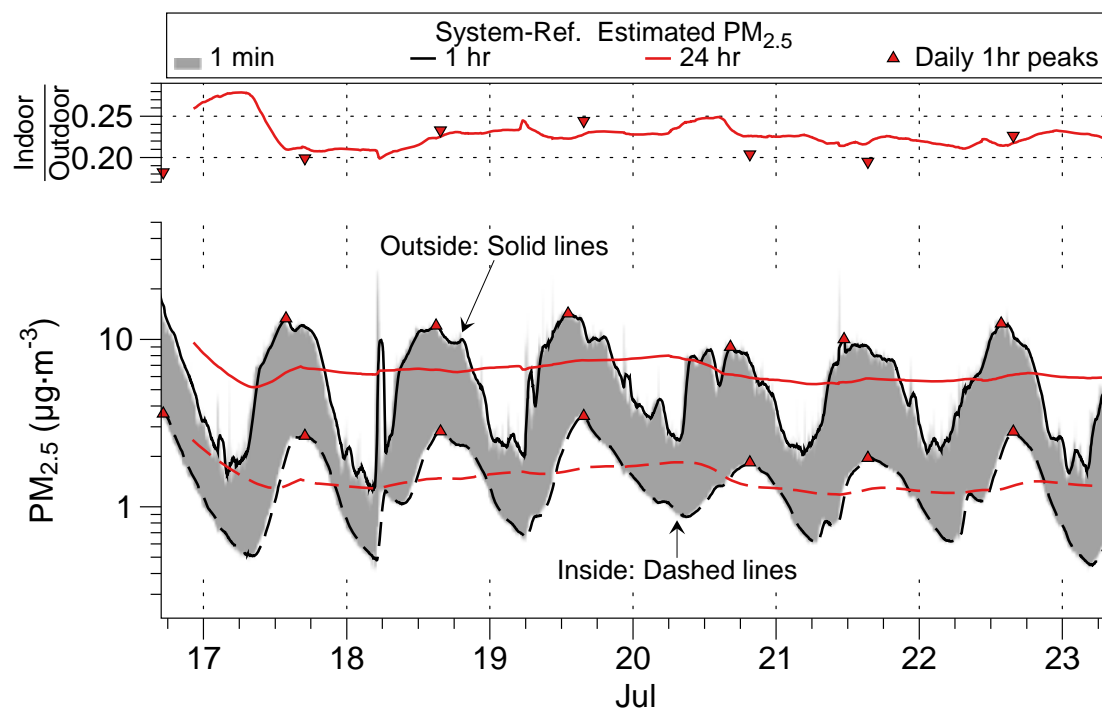


Figure SU-7-R-14. Estimated PM_{2.5} concentration calculated from size-resolved particle number concentrations measured by MetOne and CPC during operation of Reference System, July 16-23, 2014. Details provided in body of report. Refer to “Guide” before Figure SU-7-R-3.

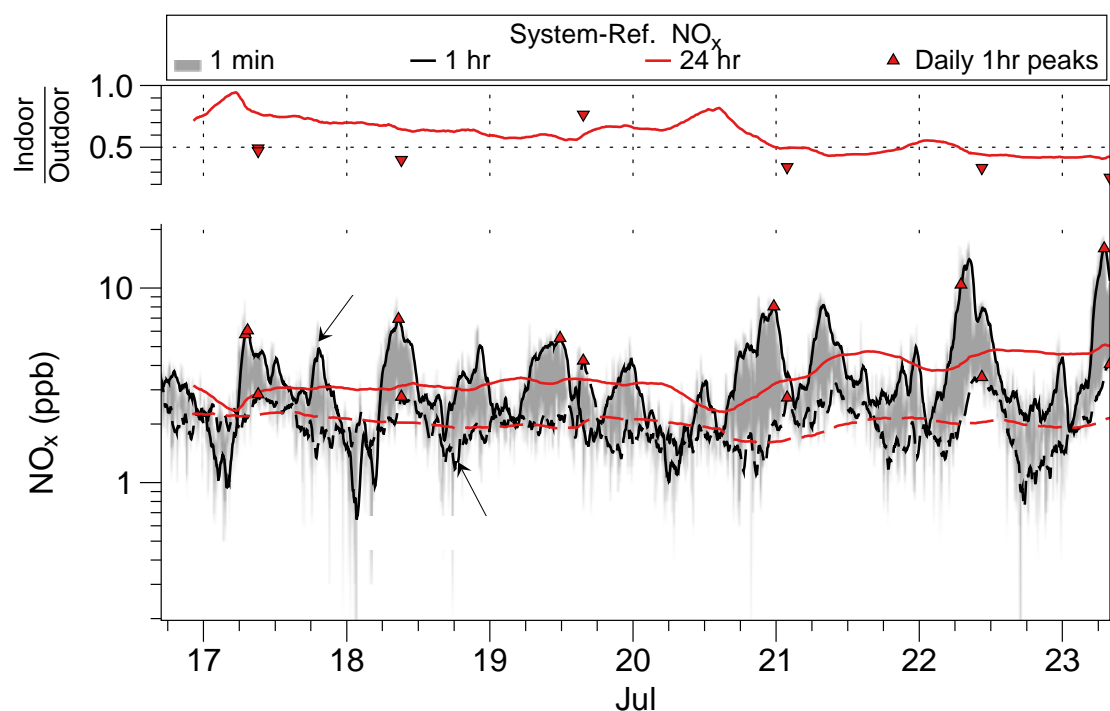


Figure SU-7-R-15. Nitrogen oxides concentrations measured outdoors and indoors during operation of Reference System, July 16-23, 2014. Data collected using API 200A and 200E chemiluminescence analyzers.

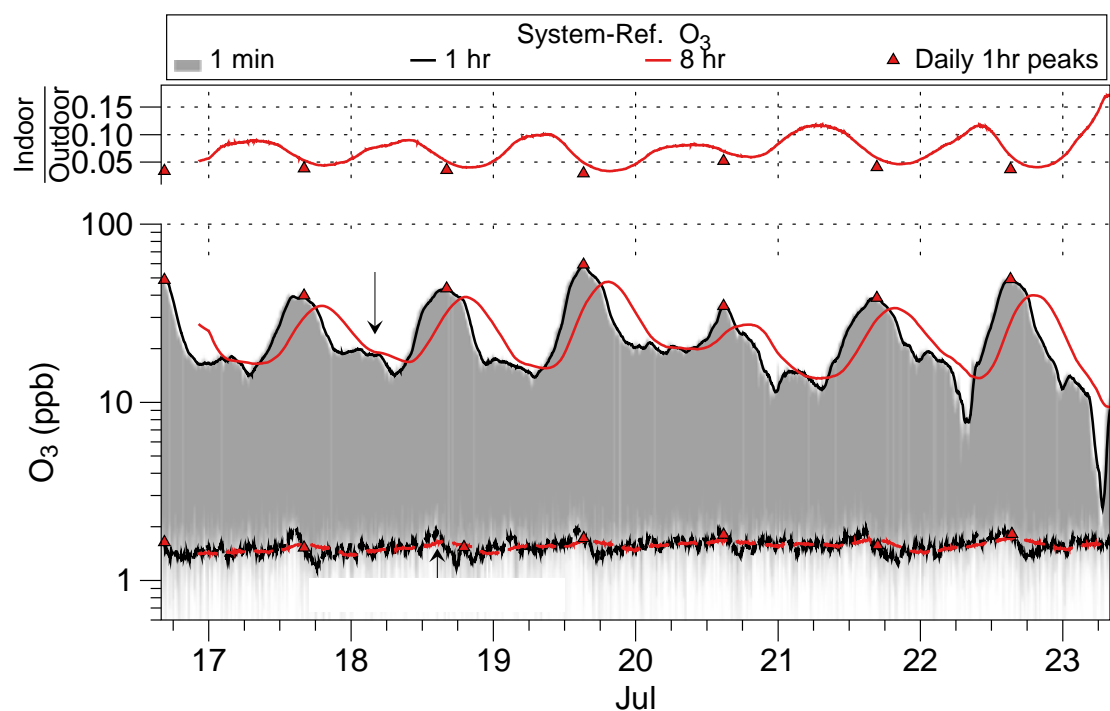


Figure SU-7-R-16. Ozone concentrations measured outdoors and indoors during operation of Reference System, July 16-23, 2014. Data collected using 2B Technologies Model 202 analyzers.

Table SU-7-R-2. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 6 nm to 2.5 micron measured using the TSI 3787 CPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Mean ¹	SD ¹
Outdoor 24h mean	8.7E+3	1.6E+4	1.5E+4	1.3E+4	1.5E+4	1.7E+4	1.4E+4	2.8E+3
Outdoor 24 SD	7.3E+3	1.2E+4	9.7E+3	9.1E+3	1.1E+4	1.2E+4	1.0E+4	1.5E+3
Indoor 24h mean	1.3E+3	1.8E+3	1.9E+3	1.9E+3	1.6E+3	1.9E+3	1.7E+3	2.3E+2
Indoor 24 SD	1.1E+3	1.3E+3	1.1E+3	1.0E+3	8.0E+2	1.2E+3	1.1E+3	1.5E+2
24h mean In/Out	0.15	0.11	0.12	0.14	0.11	0.11	0.12	0.02
Highest 8h Outdoor	2.3E+4	3.0E+4	2.6E+4	2.3E+4	2.8E+4	3.1E+4	2.7E+4	3.2E+3
Highest 8h Indoor	3.3E+3	3.4E+3	3.1E+3	3.0E+3	2.5E+3	3.3E+3	3.1E+3	3.1E+2
Highest 8 h In/Out	0.15	0.12	0.12	0.13	0.09	0.11	0.12	0.02
Highest 1h Outdoor	2.4E+4	3.9E+4	3.6E+4	3.8E+4	4.1E+4	4.2E+4	3.7E+4	6.1E+3
Highest 1 h Indoor ²	3.3E+3	3.4E+3	3.1E+3	3.0E+3	2.5E+3	3.3E+3	3.5E+3	4.4E+2
Highest 1h In/Out	0.14	0.10	0.10	0.09	0.07	0.10	0.10	0.02
Time of highest 1h Outdoor	7/16/14 18:07	7/17/14 10:38	7/18/14 9:33	7/19/14 8:54	7/20/14 9:50	7/21/14 11:22		
Corresponding highest 1h Indoor	7/16/14 18:07	7/17/14 14:38	7/18/14 13:33	7/19/14 12:54	7/20/14 13:50	7/21/14 13:00		

¹ Based on 24h periods starting / ending at 7am. Day 1 starts at 7/16/2014 22:15, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-7-R-3. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 100 nm to 2.5 micron measured using the TSI 3781 CPC with size selector.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Mean ¹	SD ¹
Outdoor 24h mean	4.4E+2	7.5E+2	8.2E+2	1.0E+3	4.9E+2	6.0E+2	6.9E+2	2.0E+2
Outdoor 24 SD	6.0E+2	7.2E+2	6.3E+2	8.1E+2	3.2E+2	4.0E+2	5.8E+2	1.7E+2
Indoor 24h mean	2.0E+2	2.0E+2	2.3E+2	2.8E+2	1.6E+2	1.7E+2	2.1E+2	4.1E+1
Indoor 24 SD	1.7E+2	1.6E+2	1.4E+2	1.8E+2	6.6E+1	8.6E+1	1.3E+2	4.3E+1
24h mean In/Out	0.41	0.31	0.27	0.27	0.32	0.30	0.31	0.05
Highest 8h Outdoor	3.2E+3	1.7E+3	1.6E+3	2.0E+3	8.7E+2	1.1E+3	1.8E+3	7.6E+2
Highest 8h Indoor	6.0E+2	4.0E+2	4.1E+2	5.1E+2	2.4E+2	2.8E+2	4.1E+2	1.2E+2
Highest 8 h In/Out	0.19	0.24	0.26	0.25	0.28	0.26	0.24	0.03
Highest 1h Outdoor	3.2E+3	2.1E+3	1.9E+3	2.6E+3	1.1E+3	1.2E+3	2.0E+3	7.2E+2
Highest 1 h Indoor ²	6.0E+2	4.0E+2	4.1E+2	5.1E+2	2.4E+2	2.8E+2	4.8E+2	1.4E+2
Highest 1h In/Out	0.19	0.23	0.25	0.26	0.24	0.25	0.24	0.02
Time of highest 1h Outdoor	7/16/14 16:32	7/17/14 13:51	7/18/14 15:01	7/19/14 13:07	7/20/14 18:28	7/21/14 15:09		
Corresponding highest 1h Indoor	7/16/14 17:26	7/17/14 17:29	7/18/14 15:59	7/19/14 15:45	7/20/14 19:43	7/21/14 16:07		

¹ Based on 24h periods starting / ending at 7am. Day 1 starts at 7/16/2014 22:15, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-7-R-4. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 6–100 nm based on difference between concentrations measured using the TSI 3787 CPC and the TSI 3781 CPC with size selector.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Mean ¹	SD ¹
Outdoor 24h mean	8.3E+3	1.6E+4	1.4E+4	1.2E+4	1.5E+4	1.7E+4	1.4E+4	2.8E+3
Outdoor 24 SD	6.9E+3	1.1E+4	9.4E+3	8.9E+3	1.1E+4	1.1E+4	9.8E+3	1.6E+3
Indoor 24h mean	1.1E+3	1.6E+3	1.7E+3	1.6E+3	1.4E+3	1.7E+3	1.5E+3	2.2E+2
Indoor 24 SD	9.5E+2	1.2E+3	9.9E+2	8.9E+2	7.6E+2	1.1E+3	9.8E+2	1.4E+2
24h mean In/Out	0.14	0.10	0.11	0.13	0.11	0.10	0.11	0.01
Highest 8h Outdoor	2.1E+4	2.8E+4	2.5E+4	2.1E+4	2.8E+4	3.0E+4	2.6E+4	3.5E+3
Highest 8h Indoor	2.7E+3	3.0E+3	2.8E+3	2.6E+3	2.3E+3	3.0E+3	2.7E+3	2.7E+2
Highest 8 h In/Out	0.13	0.11	0.11	0.12	0.08	0.10	0.11	0.02
Highest 1h Outdoor	2.3E+4	3.9E+4	3.5E+4	3.8E+4	4.1E+4	4.1E+4	3.6E+4	6.3E+3
Highest 1 h Indoor ²	2.7E+3	3.0E+3	2.8E+3	2.6E+3	2.3E+3	3.0E+3	3.2E+3	4.3E+2
Highest 1h In/Out	0.12	0.09	0.09	0.08	0.06	0.09	0.09	0.02
Time of highest 1h Outdoor	7/16/14 18:08	7/17/14 10:38	7/18/14 9:33	7/19/14 8:54	7/20/14 9:50	7/21/14 11:22		
Corresponding highest 1h Indoor	7/16/14 18:15	7/17/14 14:38	7/18/14 13:33	7/19/14 12:54	7/20/14 13:50	7/21/14 13:00		

¹ Based on 24h periods starting / ending at 7am. Day 1 starts at 7/16/2014 22:15, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-7-R-5. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 100–300 nm based on difference between concentrations measured using the TSI 3781 CPC with size selector and the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Mean ¹	SD ¹
Outdoor 24h mean	4.3E+5	7.4E+5	8.1E+5	1.0E+6	4.8E+5	5.9E+5	6.8E+5	2.0E+5
Outdoor 24 SD	5.9E+5	7.1E+5	6.2E+5	8.1E+5	3.2E+5	4.0E+5	5.8E+5	1.7E+5
Indoor 24h mean	1.9E+5	2.0E+5	2.2E+5	2.8E+5	1.5E+5	1.7E+5	2.0E+5	4.1E+4
Indoor 24 SD	1.7E+5	1.5E+5	1.4E+5	1.8E+5	6.6E+4	8.6E+4	1.3E+5	4.3E+4
24h mean In/Out	0.41	0.31	0.27	0.27	0.32	0.30	0.31	0.05
Highest 8h Outdoor	3.2E+6	1.7E+6	1.6E+6	2.0E+6	8.6E+5	1.1E+6	1.7E+6	7.5E+5
Highest 8h Indoor	5.9E+5	4.0E+5	4.0E+5	5.1E+5	2.3E+5	2.8E+5	4.0E+5	1.2E+5
Highest 8 h In/Out	0.19	0.24	0.25	0.25	0.27	0.26	0.24	0.03
Highest 1h Outdoor	3.2E+6	2.1E+6	1.9E+6	2.6E+6	1.1E+6	1.2E+6	2.0E+6	7.2E+5
Highest 1 h Indoor ²	5.9E+5	4.0E+5	4.0E+5	5.1E+5	2.3E+5	2.8E+5	4.7E+5	1.4E+5
Highest 1h In/Out	0.19	0.23	0.25	0.26	0.24	0.25	0.24	0.02
Time of highest 1h Outdoor	7/16/14 16:32	7/17/14 13:51	7/18/14 15:00	7/19/14 13:07	7/20/14 18:28	7/21/14 15:09		
Corresponding highest 1h Indoor	7/16/14 17:26	7/17/14 17:29	7/18/14 15:59	7/19/14 15:45	7/20/14 19:43	7/21/14 16:06		

¹ Based on 24h periods starting / ending at 7am. Day 1 starts at 7/16/2014 22:15, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-7-R-6. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.3–0.4 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Mean ¹	SD ¹
Outdoor 24h mean	7.6E+3	6.4E+3	8.2E+3	1.1E+4	7.5E+3	5.2E+3	7.6E+3	1.7E+3
Outdoor 24 SD	5.2E+3	9.5E+3	4.7E+3	4.1E+3	2.2E+3	1.8E+3	4.6E+3	2.5E+3
Indoor 24h mean	4.3E+3	2.5E+3	4.1E+3	4.5E+3	3.4E+3	2.5E+3	3.6E+3	8.3E+2
Indoor 24 SD	2.0E+3	1.2E+3	1.3E+3	1.4E+3	5.6E+2	6.1E+2	1.2E+3	5.0E+2
24h mean In/Out	0.54	0.48	0.46	0.43	0.46	0.46	0.47	0.03
Highest 8h Outdoor	3.2E+4	8.9E+3	1.4E+4	1.3E+4	9.7E+3	7.1E+3	1.4E+4	8.4E+3
Highest 8h Indoor	8.4E+3	3.4E+3	5.7E+3	5.9E+3	4.1E+3	3.2E+3	5.1E+3	1.8E+3
Highest 8 h In/Out	0.26	0.39	0.41	0.44	0.42	0.45	0.39	0.06
Highest 1h Outdoor	3.2E+4	3.3E+4	1.7E+4	1.9E+4	1.1E+4	8.6E+3	2.0E+4	9.4E+3
Highest 1 h Indoor ²	8.4E+3	3.4E+3	5.7E+3	5.9E+3	4.1E+3	3.2E+3	5.7E+3	1.6E+3
Highest 1h In/Out	0.26	0.18	0.38	0.32	0.38	0.41	0.32	0.08
Time of highest 1h Outdoor	7/16/14 16:34	7/18/14 5:45	7/18/14 18:38	7/19/14 23:12	7/20/14 21:46	7/21/14 15:13		
Corresponding highest 1h Indoor	7/16/14 17:02	7/18/14 7:00	7/18/14 19:21	7/19/14 23:53	7/20/14 22:40	7/21/14 17:21		

¹ Based on 24h periods starting / ending at 7am. Day 1 starts at 7/16/2014 22:15, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-7-R-7. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.4–0.5 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Mean ¹	SD ¹
Outdoor 24h mean	1.0E+3	1.1E+3	9.4E+2	1.2E+3	9.8E+2	6.4E+2	9.8E+2	1.8E+2
Outdoor 24 SD	6.9E+2	3.3E+3	4.7E+2	5.2E+2	4.1E+2	2.3E+2	9.4E+2	1.1E+3
Indoor 24h mean	5.3E+2	3.5E+2	5.5E+2	5.1E+2	4.1E+2	3.0E+2	4.4E+2	9.4E+1
Indoor 24 SD	2.3E+2	2.8E+2	2.2E+2	1.2E+2	7.2E+1	5.4E+1	1.6E+2	8.6E+1
24h mean In/Out	0.49	0.46	0.46	0.43	0.43	0.44	0.45	0.02
Highest 8h Outdoor	4.1E+3	1.7E+3	2.0E+3	1.5E+3	1.3E+3	8.3E+2	1.9E+3	1.0E+3
Highest 8h Indoor	1.0E+3	8.1E+2	9.1E+2	6.2E+2	5.0E+2	3.6E+2	7.0E+2	2.3E+2
Highest 8 h In/Out	0.25	0.47	0.45	0.41	0.37	0.43	0.40	0.07
Highest 1h Outdoor	4.1E+3	1.1E+4	1.8E+3	2.5E+3	1.8E+3	1.1E+3	3.7E+3	3.3E+3
Highest 1 h Indoor ²	1.0E+3	8.1E+2	9.1E+2	6.2E+2	5.0E+2	3.6E+2	7.8E+2	3.3E+2
Highest 1h In/Out	0.25	0.13	0.37	0.28	0.31	0.35	0.28	0.08
Time of highest 1h Outdoor	7/16/14 16:34	7/18/14 5:45	7/18/14 18:38	7/19/14 23:10	7/20/14 22:26	7/21/14 21:02		
Corresponding highest 1h Indoor	7/16/14 16:58	7/18/14 6:36	7/18/14 19:23	7/19/14 23:55	7/20/14 22:54	7/21/14 22:39		

¹ Based on 24h periods starting / ending at 7am. Day 1 starts at 7/16/2014 22:15, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-7-R-8. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.5–0.7 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Mean ¹	SD ¹
Outdoor 24h mean	7.7E+2	6.5E+2	5.3E+2	6.9E+2	5.3E+2	3.7E+2	5.9E+2	1.3E+2
Outdoor 24 SD	4.8E+2	2.0E+3	2.4E+2	2.5E+2	2.4E+2	1.2E+2	5.5E+2	6.4E+2
Indoor 24h mean	3.0E+2	1.8E+2	2.6E+2	2.5E+2	2.0E+2	1.5E+2	2.2E+2	5.1E+1
Indoor 24 SD	1.1E+2	1.6E+2	1.2E+2	3.0E+1	3.6E+1	1.8E+1	7.9E+1	5.3E+1
24h mean In/Out	0.35	0.38	0.39	0.36	0.37	0.39	0.37	0.01
Highest 8h Outdoor	2.2E+3	1.1E+3	1.3E+3	8.5E+2	7.6E+2	4.5E+2	1.1E+3	5.6E+2
Highest 8h Indoor	5.2E+2	4.4E+2	4.8E+2	2.8E+2	2.4E+2	1.6E+2	3.5E+2	1.4E+2
Highest 8 h In/Out	0.23	0.40	0.39	0.32	0.32	0.34	0.33	0.05
Highest 1h Outdoor	2.2E+3	7.0E+3	1.2E+3	1.2E+3	1.0E+3	5.3E+2	2.2E+3	2.2E+3
Highest 1 h Indoor ²	5.2E+2	4.4E+2	4.8E+2	2.8E+2	2.4E+2	1.6E+2	3.8E+2	2.1E+2
Highest 1h In/Out	0.23	0.11	0.20	0.26	0.26	0.33	0.23	0.07
Time of highest 1h Outdoor	7/16/14 16:34	7/18/14 5:44	7/19/14 6:57	7/19/14 23:09	7/20/14 22:26	7/21/14 21:01		
Corresponding highest 1h Indoor	7/16/14 16:50	7/18/14 6:31	7/19/14 10:57	7/19/14 23:48	7/20/14 22:42	7/21/14 23:34		

¹ Based on 24h periods starting / ending at 7am. Day 1 starts at 7/16/2014 22:15, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-7-R-9. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.7–1.0 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Mean ¹	SD ¹
Outdoor 24h mean	3.1E+2	1.7E+2	1.6E+2	2.2E+2	1.5E+2	1.1E+2	1.9E+2	6.5E+1
Outdoor 24 SD	2.0E+2	3.3E+2	9.7E+1	6.6E+1	5.5E+1	2.7E+1	1.3E+2	1.0E+2
Indoor 24h mean	7.6E+1	3.9E+1	5.0E+1	5.7E+1	4.1E+1	3.4E+1	5.0E+1	1.4E+1
Indoor 24 SD	2.6E+1	2.4E+1	1.7E+1	9.3E+0	7.8E+0	5.3E+0	1.5E+1	8.0E+0
24h mean In/Out	0.21	0.26	0.29	0.26	0.27	0.30	0.26	0.03
Highest 8h Outdoor	5.6E+2	2.3E+2	2.7E+2	2.7E+2	2.1E+2	1.3E+2	2.8E+2	1.4E+2
Highest 8h Indoor	1.1E+2	6.9E+1	8.1E+1	5.9E+1	4.8E+1	3.2E+1	6.7E+1	2.5E+1
Highest 8 h In/Out	0.20	0.30	0.30	0.22	0.23	0.24	0.25	0.04
Highest 1h Outdoor	6.5E+2	1.3E+3	5.0E+2	4.8E+2	2.4E+2	1.5E+2	5.5E+2	3.7E+2
Highest 1 h Indoor ²	1.1E+2	6.9E+1	8.1E+1	5.9E+1	4.8E+1	3.2E+1	7.8E+1	3.2E+1
Highest 1h In/Out	0.17	0.10	0.14	0.14	0.23	0.25	0.17	0.05
Time of highest 1h Outdoor	7/16/14 19:23	7/18/14 5:44	7/19/14 6:57	7/19/14 7:00	7/20/14 22:17	7/21/14 15:29		
Corresponding highest 1h Indoor	7/16/14 21:13	7/18/14 6:31	7/19/14 8:13	7/19/14 8:13	7/20/14 22:47	7/21/14 15:29		

¹ Based on 24h periods starting / ending at 7am. Day 1 starts at 7/16/2014 22:15, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-7-R-10. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 1.0–2.5 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Mean ¹	SD ¹
Outdoor 24h mean	2.8E+2	1.3E+2	1.6E+2	2.1E+2	1.3E+2	1.0E+2	1.7E+2	5.8E+1
Outdoor 24 SD	2.1E+2	1.2E+2	1.4E+2	8.0E+1	5.5E+1	3.4E+1	1.1E+2	5.8E+1
Indoor 24h mean	3.6E+1	2.0E+1	2.4E+1	3.3E+1	2.2E+1	2.0E+1	2.6E+1	6.3E+0
Indoor 24 SD	1.3E+1	6.6E+0	6.6E+0	9.6E+0	5.0E+0	6.9E+0	8.0E+0	2.7E+0
24h mean In/Out	0.11	0.15	0.16	0.15	0.15	0.19	0.15	0.03
Highest 8h Outdoor	5.6E+2	2.1E+2	1.9E+2	2.8E+2	1.9E+2	1.4E+2	2.6E+2	1.4E+2
Highest 8h Indoor	4.9E+1	2.2E+1	2.1E+1	3.0E+1	2.4E+1	1.8E+1	2.7E+1	1.0E+1
Highest 8 h In/Out	0.09	0.10	0.11	0.11	0.13	0.13	0.11	0.02
Highest 1h Outdoor	6.7E+2	4.4E+2	6.5E+2	6.1E+2	2.3E+2	1.5E+2	4.6E+2	2.0E+2
Highest 1 h Indoor ²	4.9E+1	2.2E+1	2.1E+1	3.0E+1	2.4E+1	1.8E+1	4.2E+1	1.4E+1
Highest 1h In/Out	0.08	0.10	0.08	0.09	0.11	0.13	0.10	0.02
Time of highest 1h Outdoor	7/16/14 19:07	7/18/14 5:43	7/19/14 6:57	7/19/14 7:00	7/20/14 15:20	7/21/14 15:27		
Corresponding highest 1h Indoor	7/16/14 21:13	7/18/14 6:31	7/19/14 7:54	7/19/14 7:54	7/20/14 15:20	7/21/14 15:27		

¹ Based on 24h periods starting / ending at 7am. Day 1 starts at 7/16/2014 22:15, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-7-R-11. Summary statistics for estimated PM_{2.5} concentrations (µg m⁻³) calculated from particle number concentrations resolved by size from 6 nm to 2.5 microns (as reported in Tables SU-7-R-2 to SU-7-R-9) and resulting indoor/outdoor ratios.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Mean ¹	SD ¹
Outdoor 24h mean	5.3E+0	6.5E+0	6.8E+0	7.8E+0	5.4E+0	5.7E+0	6.3E+0	8.8E-1
Outdoor 24 SD	4.4E+0	4.6E+0	3.6E+0	3.9E+0	2.5E+0	2.8E+0	3.6E+0	7.6E-1
Indoor 24h mean	1.5E+0	1.3E+0	1.6E+0	1.8E+0	1.2E+0	1.2E+0	1.4E+0	2.3E-1
Indoor 24 SD	9.8E-1	7.7E-1	7.1E-1	8.1E-1	3.8E-1	4.7E-1	6.9E-1	2.0E-1
24h mean In/Out	0.26	0.22	0.23	0.23	0.23	0.22	0.23	0.01
Highest 8h Outdoor	2.0E+1	1.2E+1	1.1E+1	1.2E+1	7.9E+0	8.7E+0	1.2E+1	3.9E+0
Highest 8h Indoor	3.6E+0	2.3E+0	2.5E+0	2.8E+0	1.6E+0	1.8E+0	2.4E+0	6.5E-1
Highest 8 h In/Out	0.18	0.20	0.23	0.23	0.21	0.20	0.21	0.02
Highest 1h Outdoor	2.0E+1	1.3E+1	1.2E+1	1.4E+1	9.0E+0	1.0E+1	1.3E+1	3.5E+0
Highest 1 h Indoor ²	3.6E+0	2.3E+0	2.5E+0	2.8E+0	1.6E+0	1.8E+0	2.7E+0	6.7E-1
Highest 1h In/Out	0.18	0.20	0.23	0.24	0.20	0.20	0.21	0.02
Time of highest 1h Outdoor	7/16/14 16:33	7/17/14 13:50	7/18/14 15:00	7/19/14 13:07	7/20/14 16:19	7/21/14 11:22		
Corresponding highest 1h Indoor	7/16/14 17:14	7/17/14 17:00	7/18/14 15:44	7/19/14 15:44	7/20/14 19:35	7/21/14 15:22		

¹ Based on 24h periods starting / ending at 7am. Day 1 starts at 7/16/2014 22:15, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-7-R-12. Summary statistics for concentrations of PM_{2.5} (µg m⁻³) and indoor /outdoor ratios from measurements reported by TSI DustTrak II.

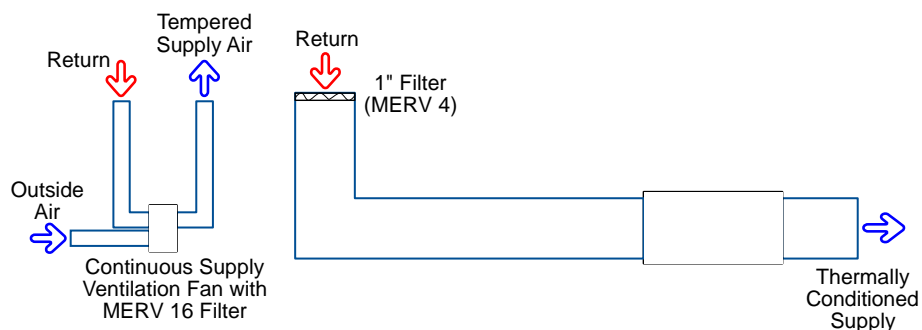
Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Mean ¹	SD ¹
Outdoor 24h mean	1.6E-3	1.6E-3	1.9E-3	2.1E-3	2.0E-3	1.4E-3	1.8E-3	2.5E-4
Outdoor 24 SD	7.8E-4	6.7E-4	6.0E-4	4.5E-4	5.9E-4	2.5E-4	5.6E-4	1.7E-4
Indoor 24h mean	3.4E-3	3.4E-3	5.0E-3	6.8E-3	4.4E-3	2.6E-3	4.3E-3	1.4E-3
Indoor 24 SD	3.5E-3	6.6E-3	3.3E-3	3.8E-3	2.3E-3	1.6E-3	3.5E-3	1.6E-3
24h mean In/Out	0.31	0.57	0.40	0.32	0.39	0.48	0.41	0.09
Highest 8h Outdoor	2.1E-2	4.9E-3	8.6E-3	9.3E-3	6.4E-3	4.2E-3	9.1E-3	5.7E-3
Highest 8h Indoor	3.3E-3	1.9E-3	2.4E-3	2.4E-3	2.4E-3	1.6E-3	2.3E-3	5.2E-4
Highest 8 h In/Out	0.15	0.38	0.28	0.26	0.38	0.38	0.31	0.08
Highest 1h Outdoor	2.1E-2	2.2E-2	1.1E-2	1.2E-2	8.8E-3	6.3E-3	1.3E-2	6.0E-3
Highest 1 h Indoor ²	3.3E-3	1.9E-3	2.4E-3	2.4E-3	2.4E-3	1.6E-3	2.5E-3	4.5E-4
Highest 1h In/Out	0.15	0.12	0.20	0.21	0.32	0.30	0.22	0.07
Time of highest 1h Outdoor	7/16/14 16:33	7/18/14 5:45	7/18/14 18:57	7/19/14 23:10	7/20/14 15:14	7/21/14 15:15		
Corresponding highest 1h Indoor	7/16/14 16:33	7/18/14 6:42	7/18/14 19:29	7/20/14 0:58	7/20/14 15:45	7/21/14 15:15		

¹ Based on 24h periods starting / ending at 7am. Day 1 starts at 7/16/2014 22:15, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-7-R-13. Daily¹ summary statistics for concentrations (nanograms m⁻³) and indoor /outdoor ratios of aerosol black carbon measured using the Aethalometer AE22.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Mean ¹	SD ¹
Outdoor 24h mean	1.5E+2	2.3E+2	2.0E+2	1.9E+2	1.6E+2	1.6E+2	1.8E+2	2.7E+1
Outdoor 24 SD	1.1E+2	5.2E+2	7.7E+1	7.3E+1	7.6E+1	7.4E+1	1.5E+2	1.6E+2
Indoor 24h mean	6.6E+1	7.6E+1	1.0E+2	7.9E+1	6.6E+1	9.0E+1	8.0E+1	1.3E+1
Indoor 24 SD	4.3E+1	4.9E+1	4.3E+1	3.2E+1	2.4E+1	4.8E+1	4.0E+1	9.0E+0
24h mean In/Out	0.45	0.39	0.42	0.42	0.43	0.46	0.43	0.02
Highest 8h Outdoor	5.4E+2	3.1E+2	4.2E+2	2.7E+2	2.4E+2	2.0E+2	3.3E+2	1.2E+2
Highest 8h Indoor	1.7E+2	1.4E+2	1.6E+2	1.1E+2	8.9E+1	9.1E+1	1.3E+2	3.3E+1
Highest 8 h In/Out	0.32	0.46	0.39	0.41	0.37	0.45	0.40	0.05
Highest 1h Outdoor	5.4E+2	1.7E+3	3.2E+2	3.2E+2	3.1E+2	2.7E+2	5.8E+2	5.2E+2
Highest 1 h Indoor ²	1.7E+2	1.4E+2	1.6E+2	1.1E+2	8.9E+1	9.1E+1	1.4E+2	4.9E+1
Highest 1h In/Out	0.32	0.13	0.28	0.48	0.37	0.33	0.32	0.11
Time of highest 1h Outdoor	7/16/14 16:33	7/18/14 5:45	7/18/14 22:21	7/19/14 15:00	7/20/14 21:42	7/21/14 8:06		
Corresponding highest 1h Indoor	7/16/14 16:42	7/18/14 6:21	7/18/14 22:45	7/19/14 16:21	7/20/14 22:48	7/21/14 12:06		

¹ Based on 24h periods starting / ending at 7am. Day 1 starts at 7/16/2014 22:15, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Appendix SU-8-C. Results for System C, July 23-30, 2014.**Table SU-8-C-1. Description of System C component characteristics during the period of July 23-30, 2014**

System Parameter	Description or Measured Value
Heating	75,000 BTU/h, 80% eff., gas furnace, 1-stage burner
Cooling	3 ton, SEER13 air conditioner
Thermal distribution	Central fan with PSC motor: 1200 cfm for cooling, 1074 cfm for heating
Ventilation	Blended supply fan providing tempered outside air (38 cfm) by blending with inside air (58 cfm), continuous operation.
Filtration	MERV4, 1" (Purolator F312) filter installed at return air ceiling grill of forced air furnace. MERV16 on the blended system.
Recirculation blower schedule	As required for thermal conditioning, no fan cyclers.
VOC removal system	LBNL / IQAir treated filter on the blended system

Notes about this monitoring period.

We lost a DustTrak instrument near the beginning of the operational period. The DustTrak indoor / outdoor data stream was constructed from the single remaining instrument. The majority of the operational period had the indoor DustTrak numbers at the instrument's lower detection limit (LDL). All other instruments were fine.

The 24 h running statistics in the figures starts at 7/24/2014 03:30. Data from 7/28/2014 06:00 on was censored from the largest Met1 channel due to indoor activity associated with changing sorbent tubes.

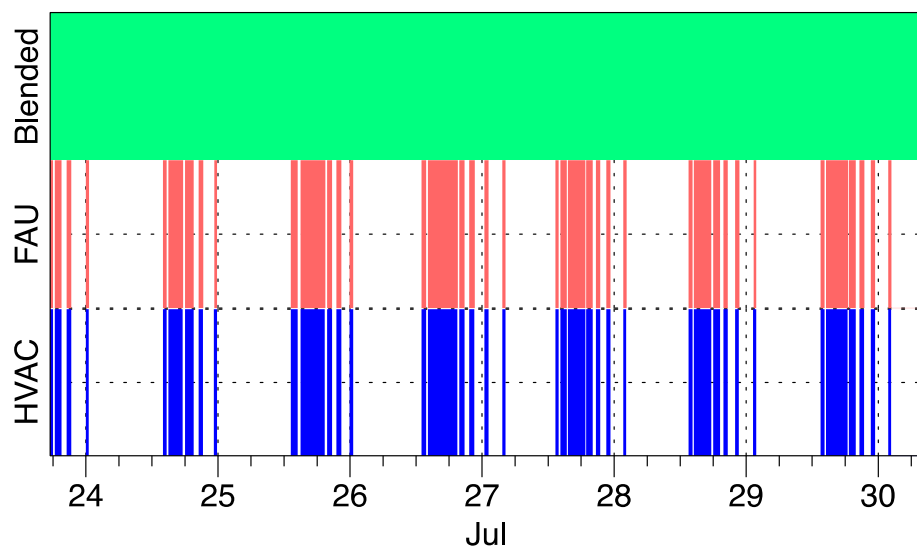


Figure SU-8-C-1. Operation of mechanical systems: Blended system fan; fan on central forced air unit (FAU); central air-conditioning (AC).

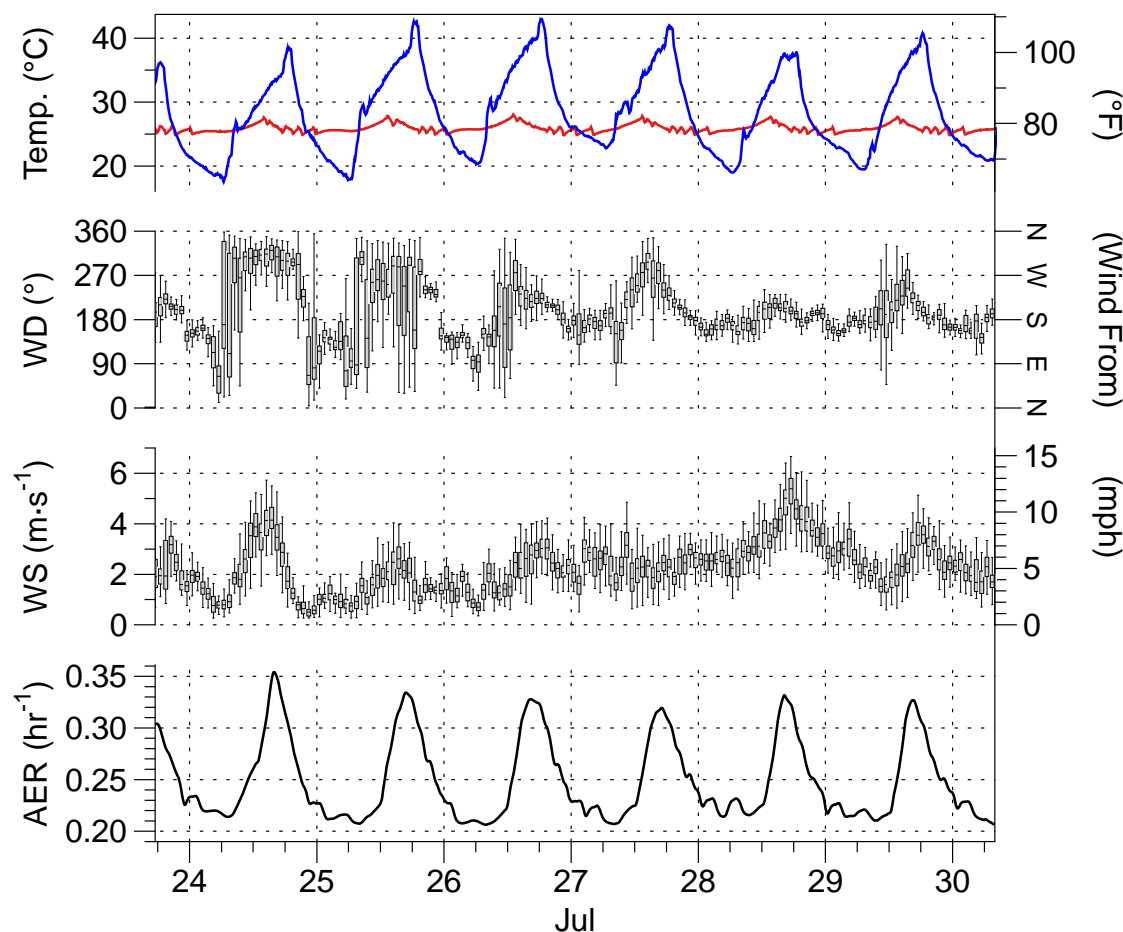


Figure SU-8-C-2. Environmental parameters measured during operation of System C, July 23-30, 2014.

From top to bottom: indoor (red) and outdoor (blue) temperatures, wind direction (WD) in units of degrees from North, wind speed (WS), and air exchange rate (AER). For WD and WS, the box for each hour shows the 25th, 50th and 75th percentiles of the measured values and whiskers extend 1.5X the interquartile range (75th–25th percentile values) above the 75th and below the 25th percentile values.

Guide to plots of pollutant concentration time series and indoor / outdoor (I/O) ratios

The bottom section of each plot shows outdoor and indoor time series using the resolution of data collection: 3-min for black carbon and 1-min for all other parameters. The top and bottom of grey band are LOESS-smoothed, 1-min (or 3-min for black carbon) time-series. Also shown are time series with 1h and 24h time averaging for most pollutants and 1h and 8h average for ozone. Triangles in bottom of plot indicate the highest 1h outdoor and corresponding highest 1h indoor average during each day. The top section of each plot shows the ratio of indoor to outdoor running 24h mean values (8h for ozone) and the ratios of highest 1h indoor to corresponding highest 1h outdoor concentration each day.

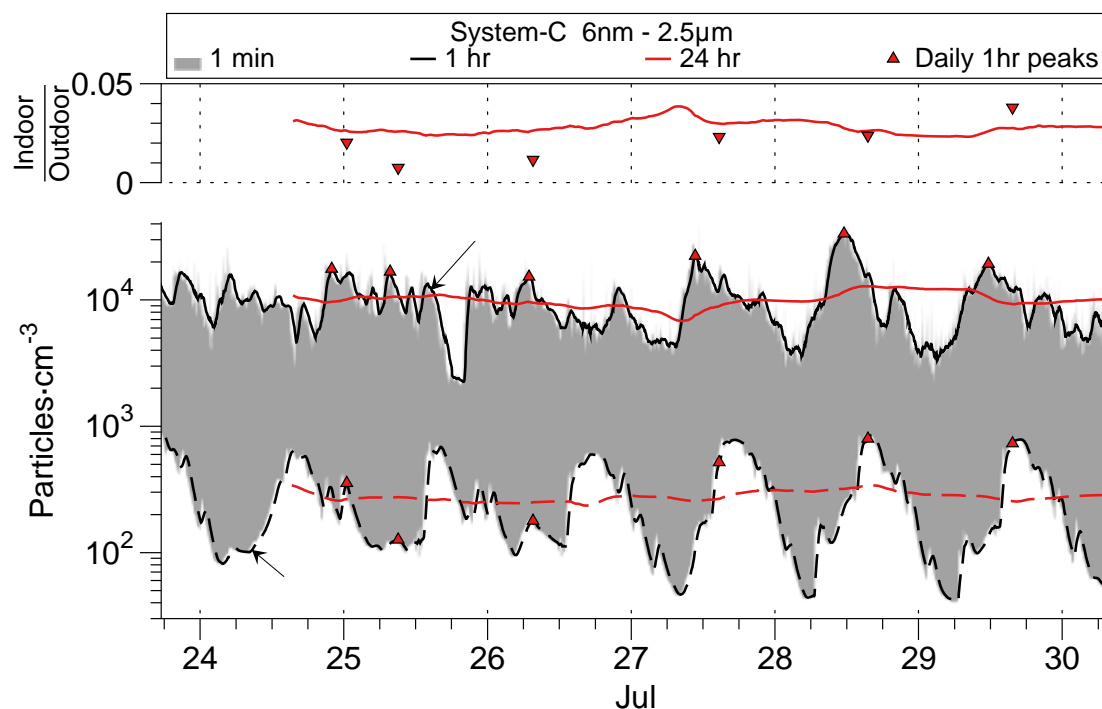


Figure SU-8-C-3. Number concentrations of 6 nm to 2.5 μm diameter particles measured outdoors and indoors during operation of System C, July 23-30, 2014. Data collected using TSI 3787 CPCs.

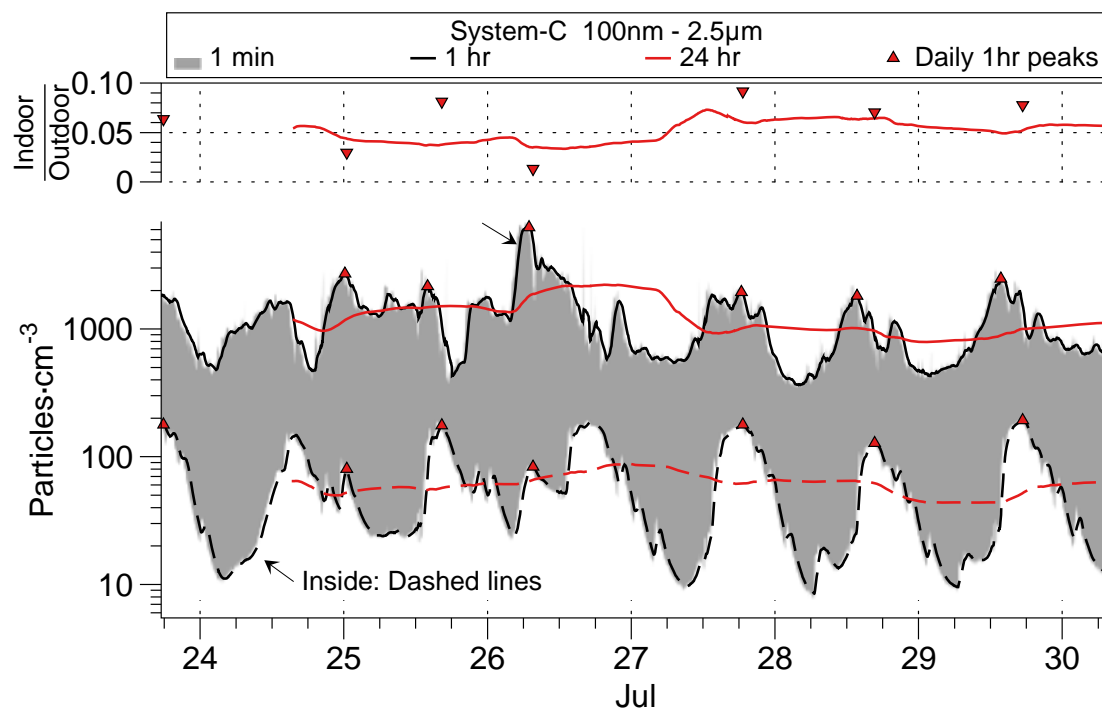


Figure SU-8-C-4. Number concentrations of 100 nm to 2.5 μm diameter particles measured outdoors and indoors during operation of System C, July 23-30, 2014. Data collected using TSI 3781 CPCs outfitted with screens to exclude particles smaller than 100 nm. Refer to “Guide” before Figure SU-8-C-3.

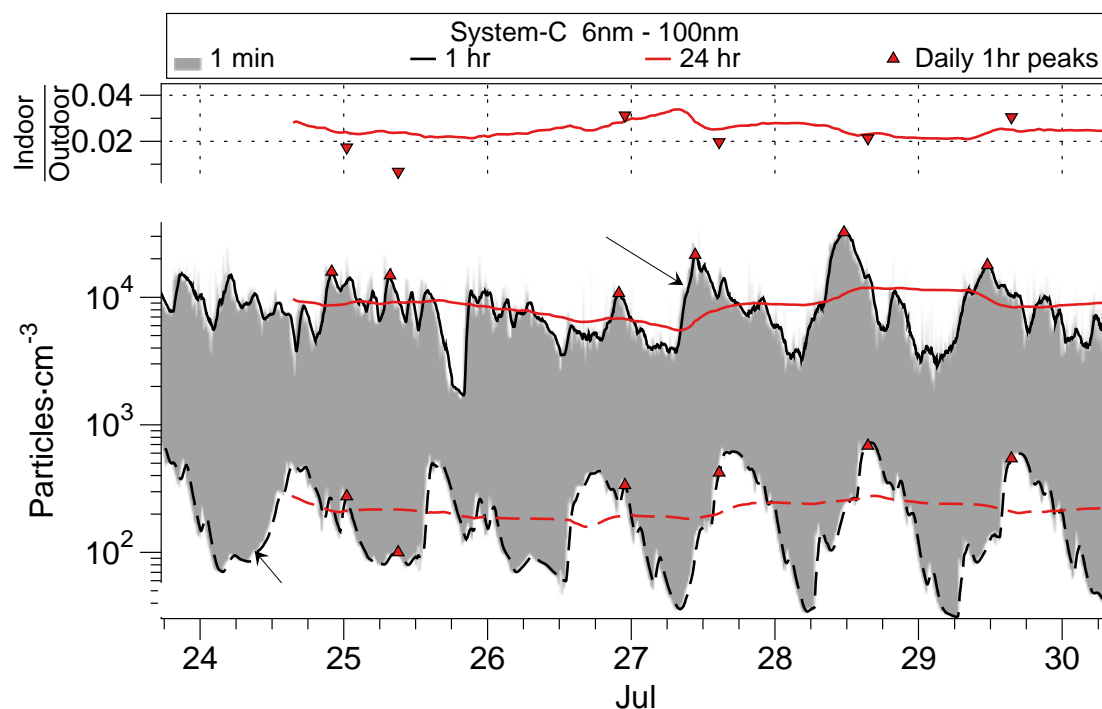


Figure SU-8-C-5. Number concentrations of 6–100 nm diameter particles measured outdoors and indoors during operation of System C, July 23-30, 2014. Data obtained as the difference between time series show in prior two figures. Refer to “Guide” before Figure SU-8-C-3.

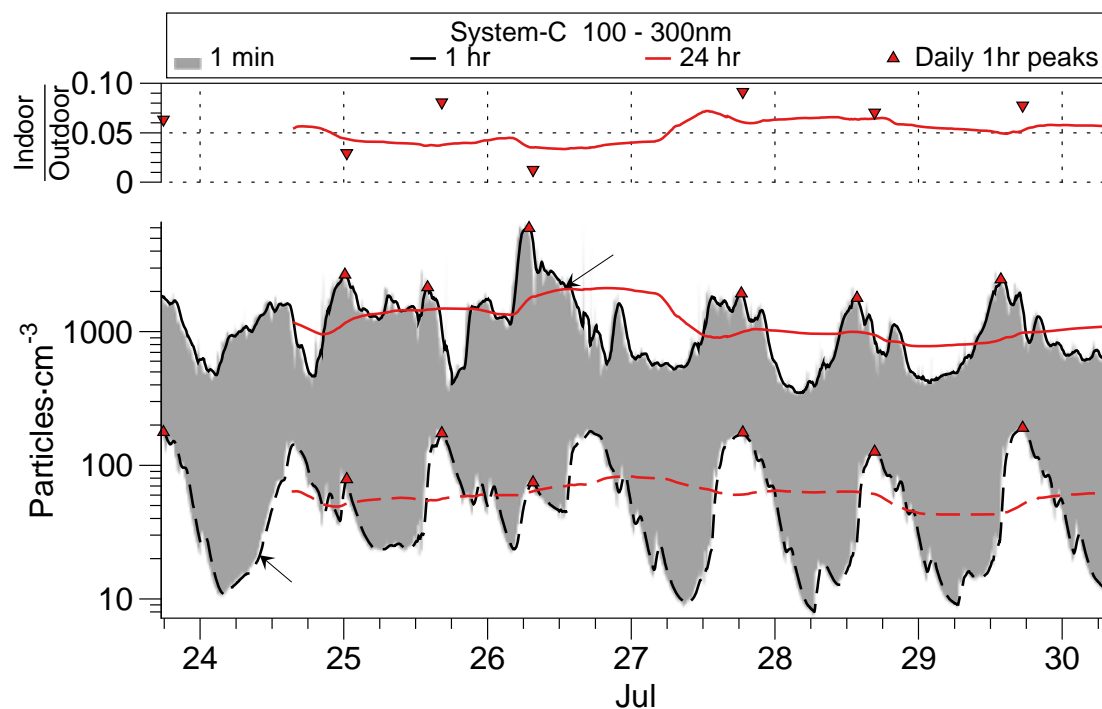


Figure SU-8-C-6. Number concentrations of 100–300 nm diameter particles measured outdoors and indoors during operation of System C, July 23-30, 2014. Data obtained as the difference between the TSI 3781 CPC with size selector and the MetOne BT637S OPC. Refer to “Guide” before Figure SU-8-C-3

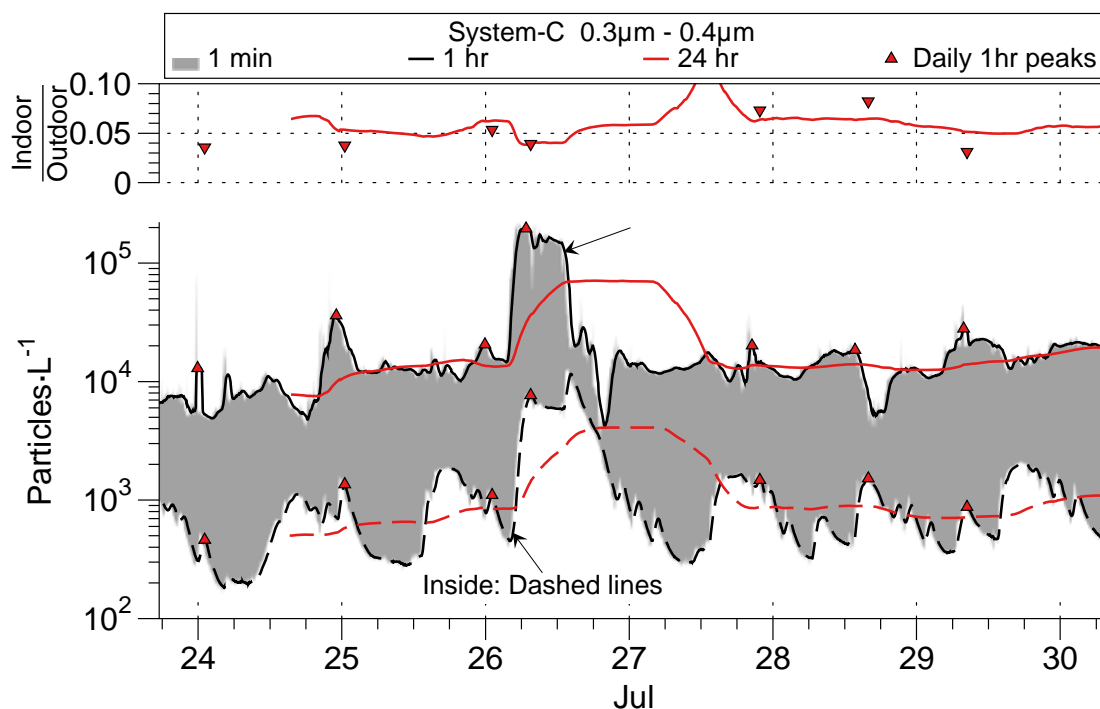


Figure SU-8-C-7. Number concentrations of 0.3–0.4 μm diameter particles measured outdoors and indoors during operation of System C, July 23-30, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-8-C-3.

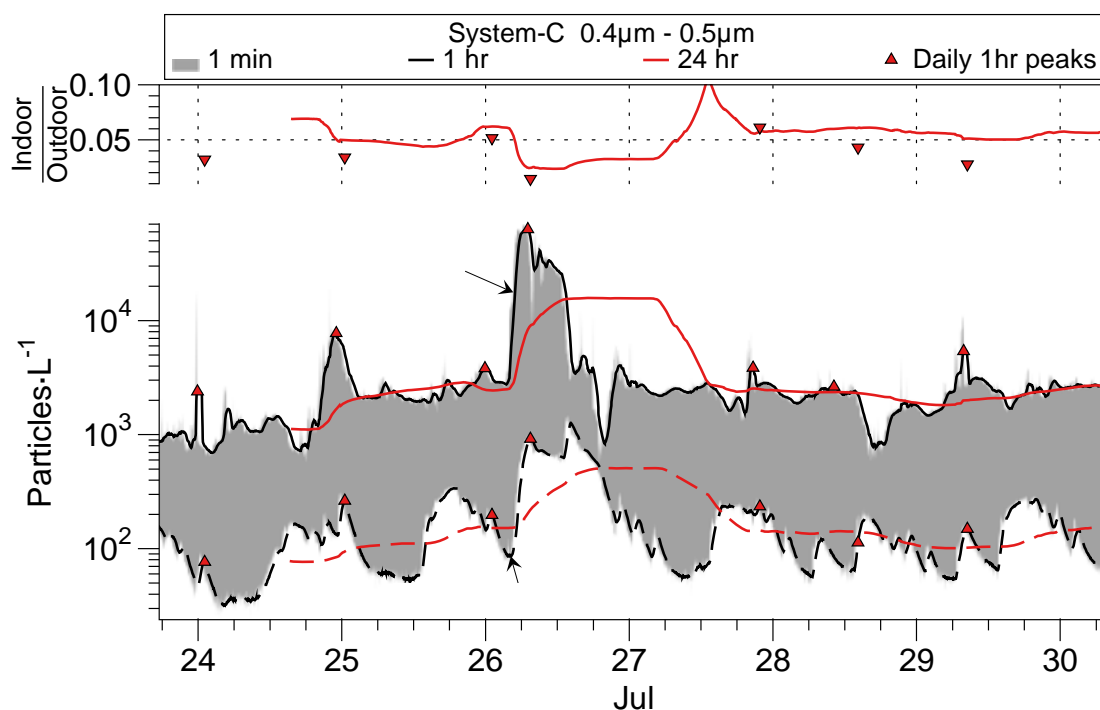


Figure SU-8-C-8. Number concentrations of 0.4–0.5 μm diameter particles measured outdoors and indoors during operation of System C, July 23-30, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-8-C-3.

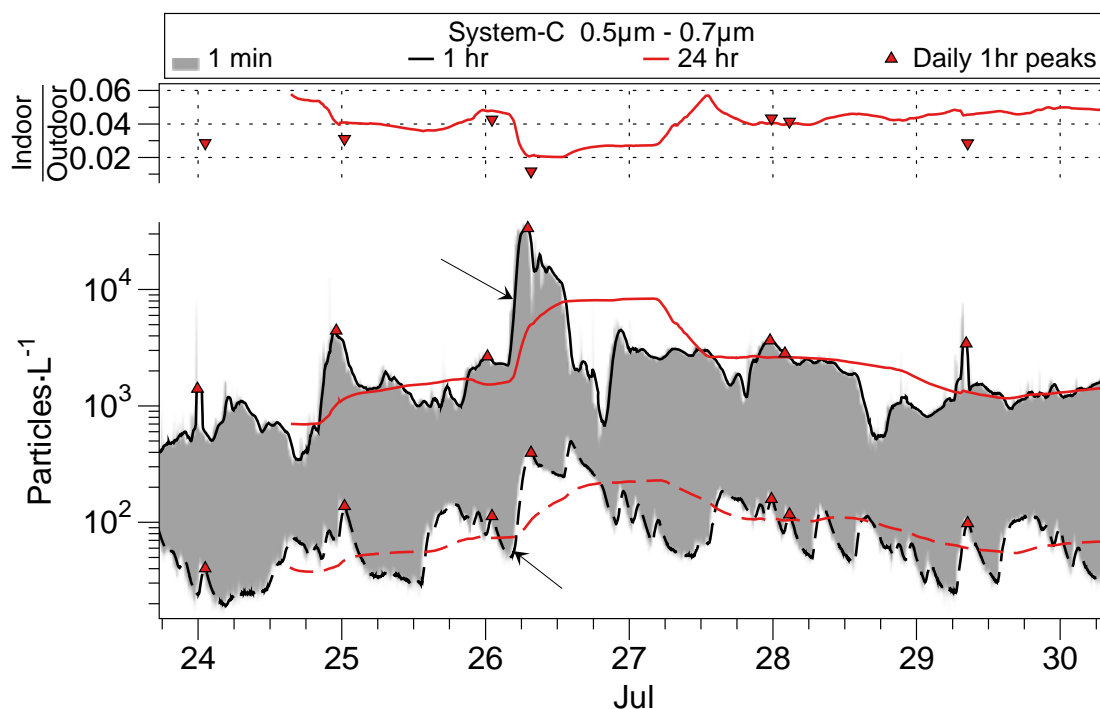


Figure SU-8-C-9. Number concentrations of 0.5–0.7 μm diameter particles measured outdoors and indoors during operation of System C, July 23-30, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-8-C-3.

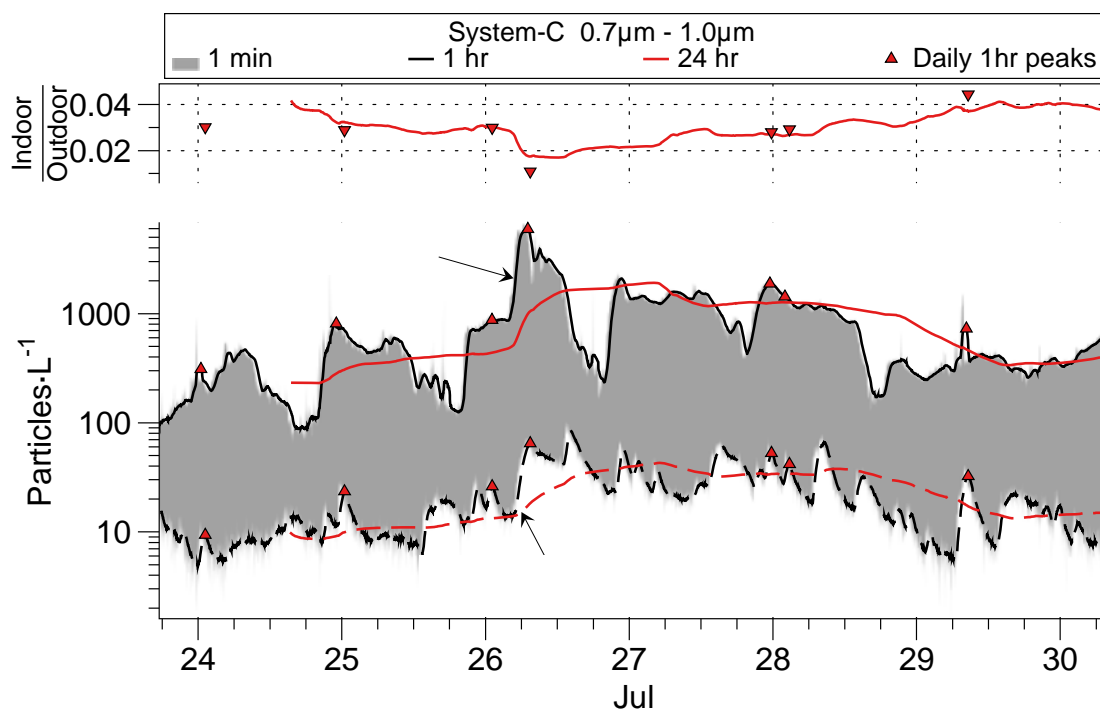


Figure SU-8-C-10. Number concentrations of 0.7–1.0 μm diameter particles measured outdoors and indoors during operation of System C, July 23-30, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-8-C-3.

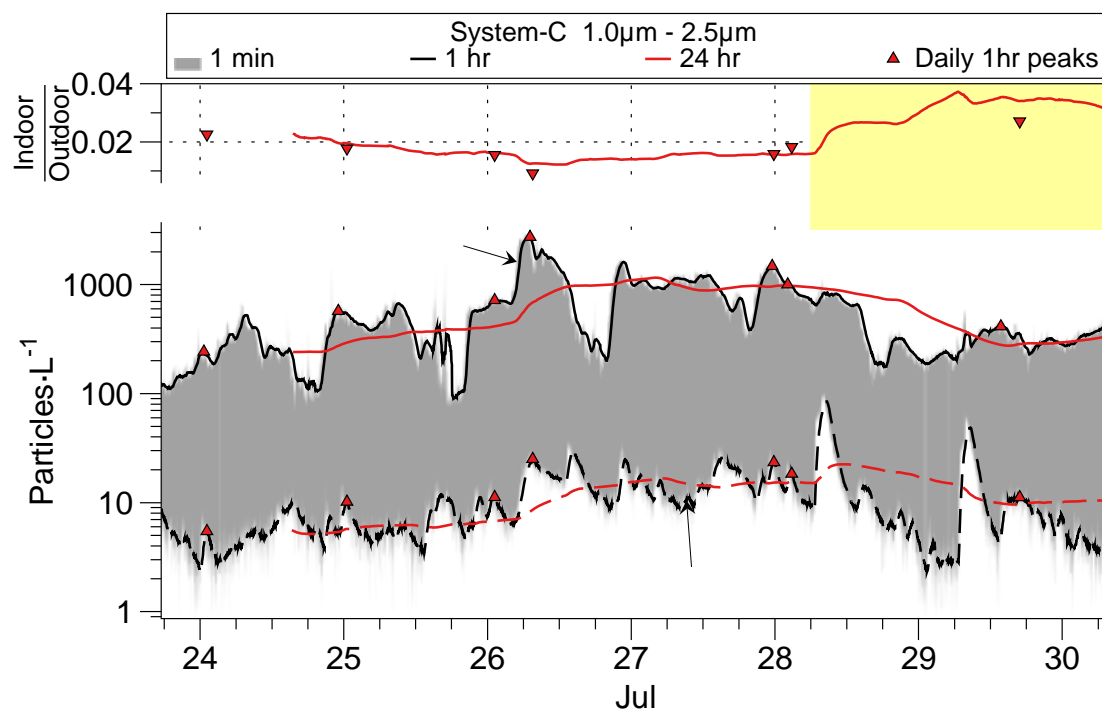


Figure SU-8-C-11. Number concentrations of 1.0–2.5 μm diameter particles measured outdoors and indoors during operation of System C, July 23-30, 2014. Data collected using MetOne BT637S particle counters. Refer to Figure SU-8-C-3 for details. The yellow band indicates censored data due to in house activity.

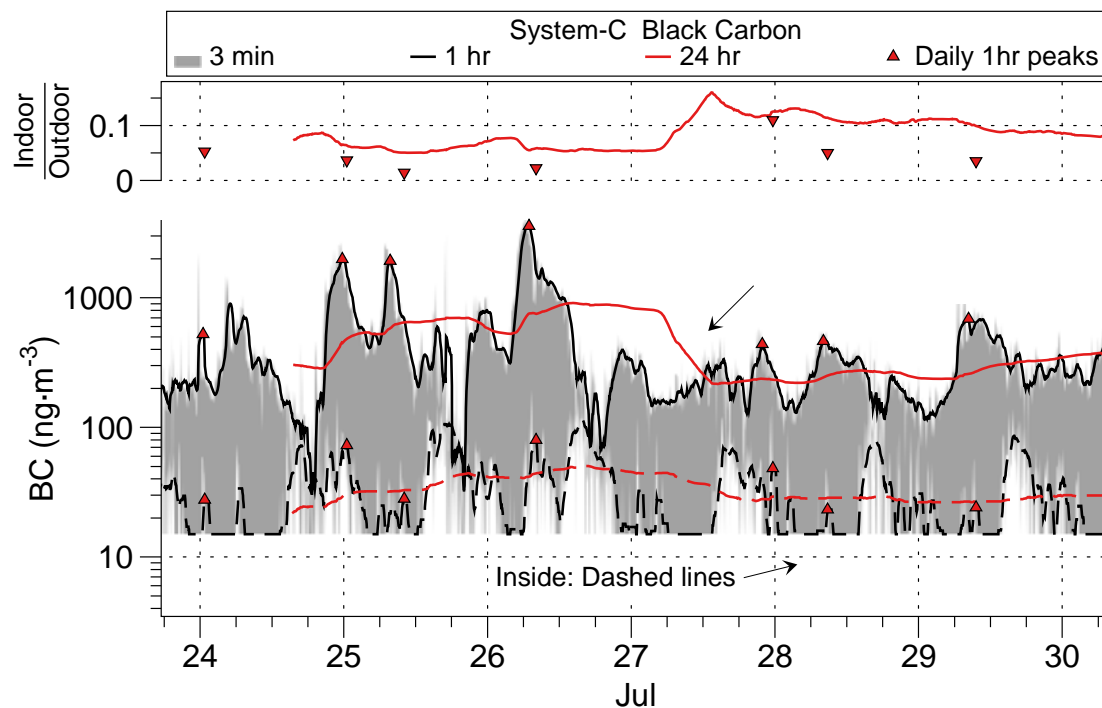


Figure SU-8-C-12. Black carbon concentrations measured outdoors and indoors during operation of System C, July 23-30, 2014. Data collected using AE22 Aethalometers with 3-min samples. Data otherwise as described in Figure SU-8-C-3 caption.

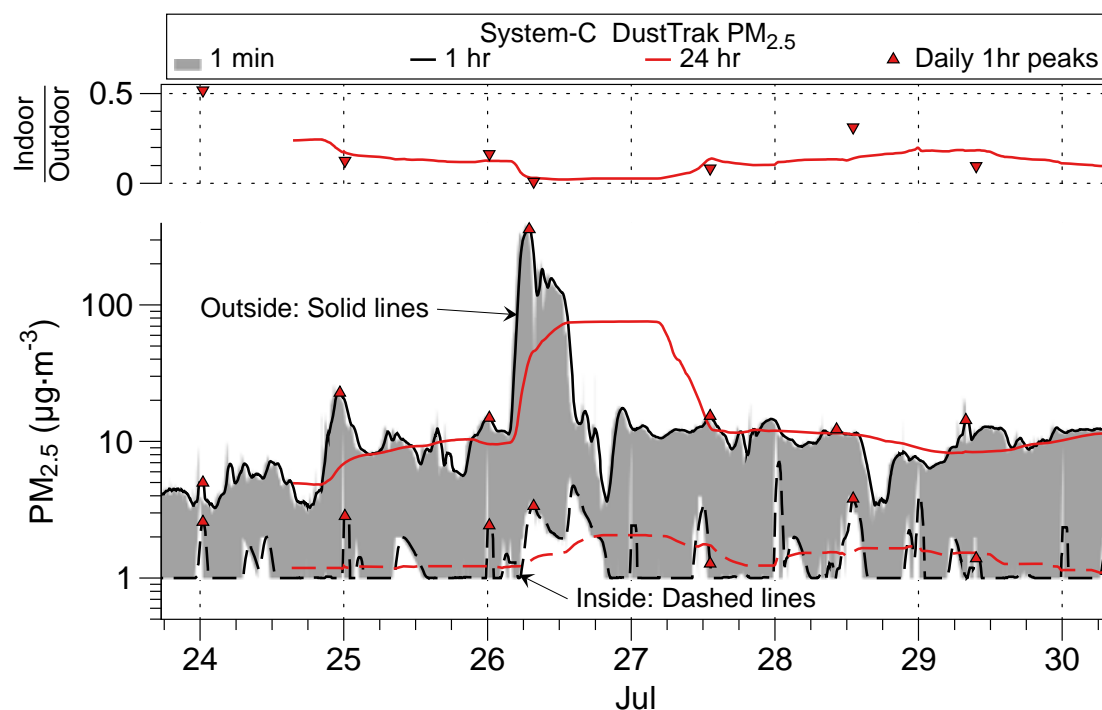


Figure SU-8-C-13. PM_{2.5} reported by TSI DustTrak II 8530 measurements outdoors and indoors during operation of System C, July 23-30, 2014. The DustTrak measures light scattering and uses a calibration to estimate PM_{2.5} mass. Refer to “Guide” before Figure SU-8-C-3.

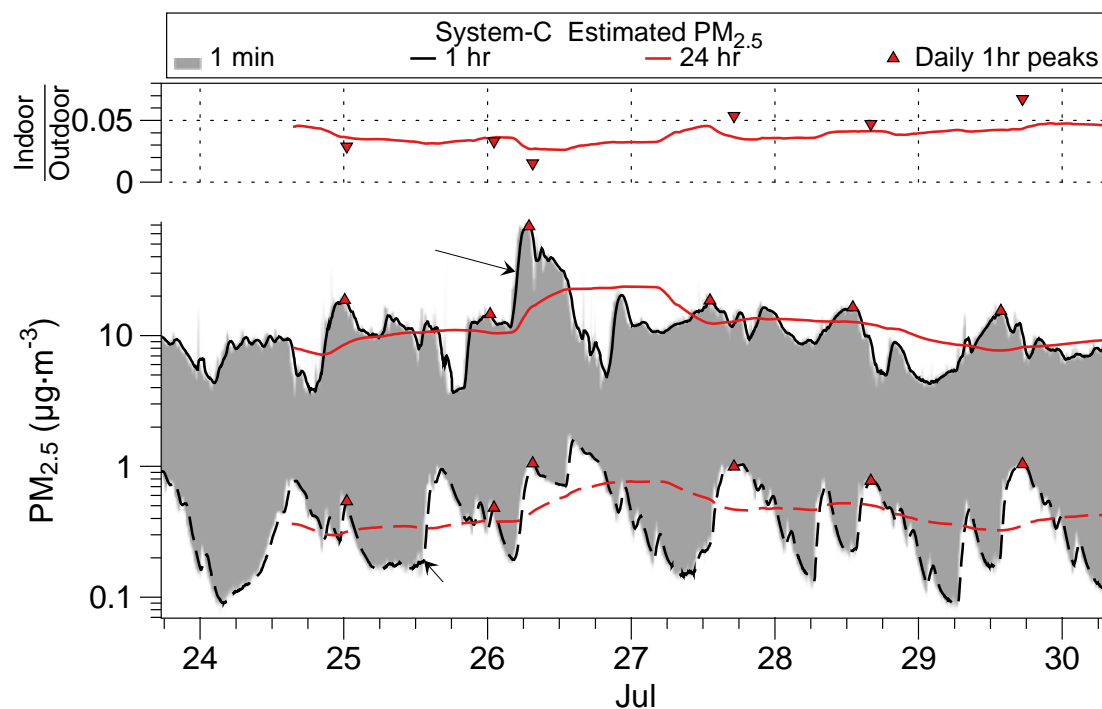


Figure SU-8-C-14. Estimated PM_{2.5} concentration calculated from size-resolved particle number concentrations measured by MetOne and CPC during operation of System C, July 23-30, 2014. Details provided in body of report. Refer to “Guide” before Figure SU-8-C-3.

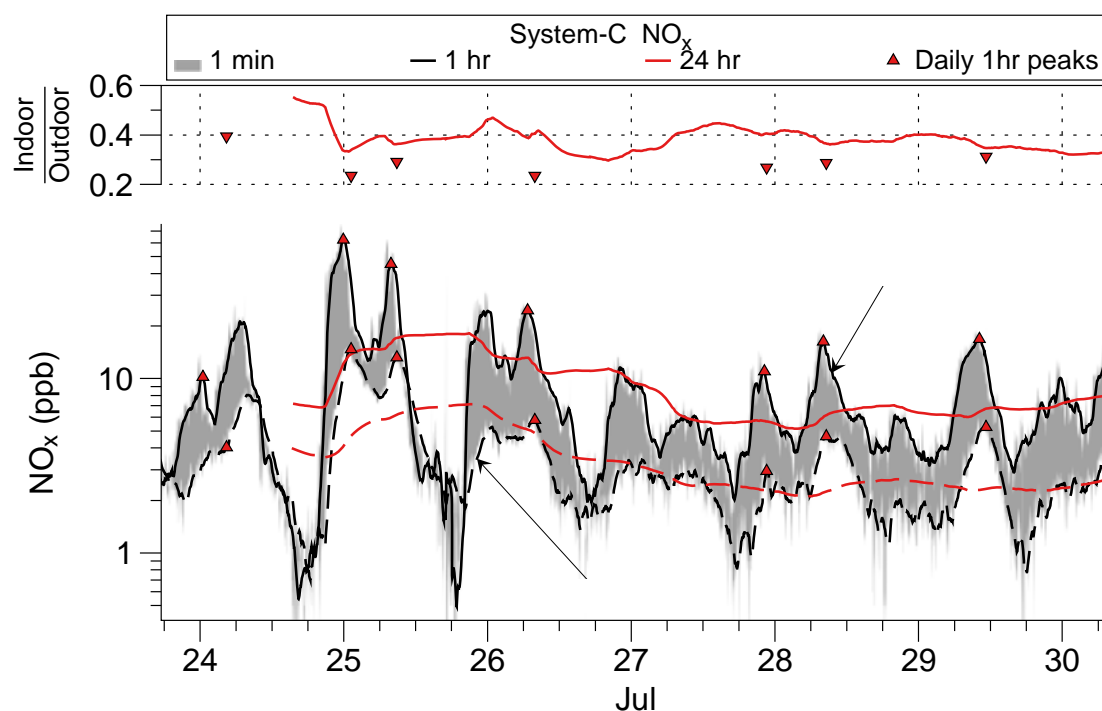


Figure SU-8-C-15. Nitrogen oxides concentrations measured outdoors and indoors during operation of System C, July 23-30, 2014. Data collected using API 200A and 200E chemiluminescence analyzers.

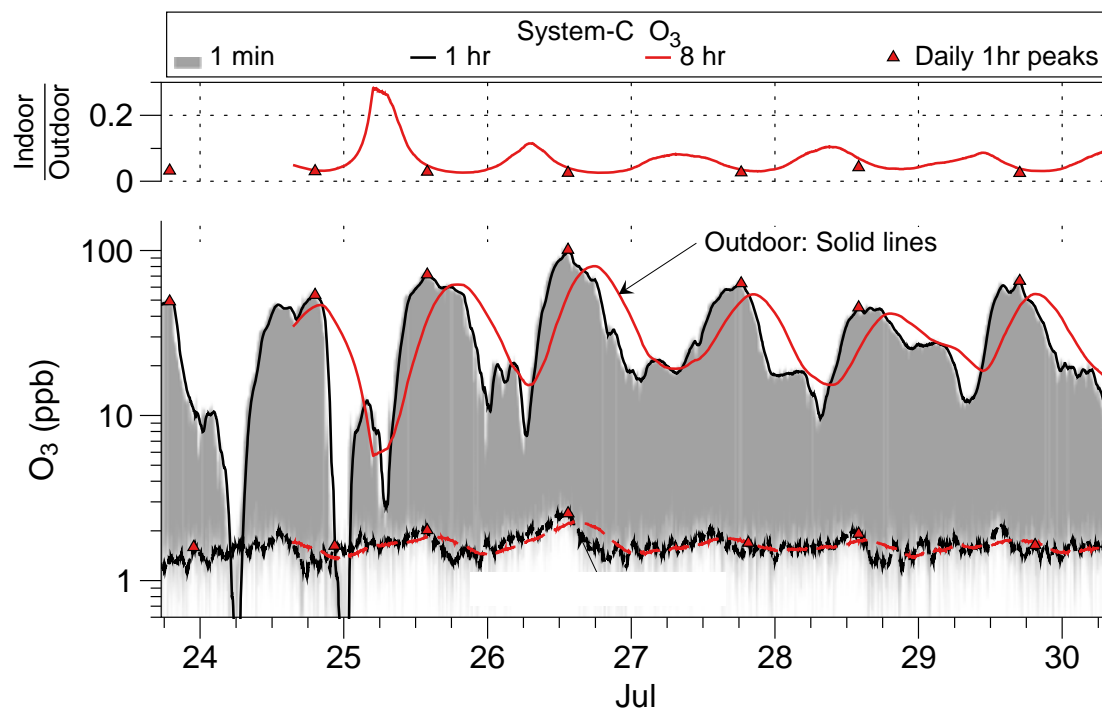


Figure SU-8-C-16. Ozone concentrations measured outdoors and indoors during operation of System C, July 23-30, 2014. Data collected using 2B Technologies Model 202 analyzers.

Table SU-8-C-2. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 6 nm to 2.5 micron measured using the TSI 3787 CPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	1.3E+4	1.1E+4	9.5E+3	8.5E+3	9.8E+3	1.2E+4	9.8E+3	1.0E+4	1.4E+3
Outdoor 24 SD	4.4E+3	3.7E+3	4.2E+3	2.9E+3	5.1E+3	9.3E+3	4.6E+3	4.9E+3	1.9E+3
Indoor 24h mean	5.3E+2	2.7E+2	2.5E+2	2.8E+2	3.1E+2	2.9E+2	2.8E+2	3.1E+2	9.1E+1
Indoor 24 SD	2.8E+2	1.7E+2	1.8E+2	1.8E+2	2.6E+2	2.4E+2	2.4E+2	2.2E+2	4.2E+1
24h mean In/Out	0.05	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.01
Highest 8h Outdoor	2.1E+4	1.2E+4	1.4E+4	1.1E+4	1.5E+4	2.3E+4	1.5E+4	1.6E+4	4.2E+3
Highest 8h Indoor	8.4E+2	2.8E+2	2.2E+2	1.6E+2	6.0E+2	5.5E+2	5.5E+2	4.6E+2	2.3E+2
Highest 8 h In/Out	0.04	0.02	0.02	0.01	0.04	0.02	0.04	0.03	0.01
Highest 1h Outdoor	2.1E+4	1.8E+4	1.7E+4	1.5E+4	2.2E+4	3.4E+4	1.9E+4	2.1E+4	5.6E+3
Highest 1 h Indoor ²	8.4E+2	2.8E+2	2.2E+2	1.6E+2	6.0E+2	5.5E+2	5.5E+2	5.2E+2	2.9E+2
Highest 1h In/Out	0.05	0.02	0.01	0.01	0.02	0.02	0.04	0.02	0.01
Time of highest 1h Outdoor	7/23/14 14:21	7/24/14 21:58	7/25/14 7:44	7/26/14 6:56	7/27/14 10:42	7/28/14 11:32	7/29/14 11:41		
Corresponding highest 1h Indoor	7/23/14 17:18	7/25/14 0:29	7/25/14 9:05	7/26/14 7:36	7/27/14 14:42	7/28/14 15:32	7/29/14 15:41		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 7/24/2014 03:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-8-C-3. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 100 nm to 2.5 micron measured using the TSI 3781 CPC with size selector.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	1.3E+3	1.3E+3	1.4E+3	2.1E+3	1.0E+3	8.0E+2	1.1E+3	1.3E+3	3.8E+2
Outdoor 24 SD	6.1E+2	6.1E+2	4.7E+2	1.6E+3	5.1E+2	4.2E+2	5.8E+2	6.8E+2	3.7E+2
Indoor 24h mean	9.8E+1	5.4E+1	6.1E+1	8.6E+1	6.5E+1	4.4E+1	6.2E+1	6.7E+1	1.7E+1
Indoor 24 SD	5.7E+1	3.9E+1	4.5E+1	5.2E+1	5.9E+1	3.8E+1	6.0E+1	5.0E+1	8.6E+0
24h mean In/Out	0.07	0.06	0.04	0.04	0.06	0.06	0.05	0.05	0.01
Highest 8h Outdoor	2.8E+3	1.7E+3	1.9E+3	3.9E+3	1.6E+3	1.2E+3	1.7E+3	2.1E+3	8.4E+2
Highest 8h Indoor	1.5E+2	5.7E+1	4.8E+1	1.0E+2	1.4E+2	9.2E+1	1.4E+2	1.0E+2	3.8E+1
Highest 8 h In/Out	0.05	0.03	0.03	0.03	0.09	0.07	0.08	0.05	0.02
Highest 1h Outdoor	2.8E+3	2.7E+3	2.2E+3	6.2E+3	1.9E+3	1.8E+3	2.5E+3	2.9E+3	1.4E+3
Highest 1 h Indoor ²	1.5E+2	5.7E+1	4.8E+1	1.0E+2	1.4E+2	9.2E+1	1.4E+2	1.5E+2	4.4E+1
Highest 1h In/Out	0.06	0.03	0.08	0.01	0.09	0.07	0.08	0.06	0.03
Time of highest 1h Outdoor	7/23/14 14:24	7/25/14 0:12	7/25/14 14:00	7/26/14 6:56	7/27/14 18:25	7/28/14 13:44	7/29/14 13:45		
Corresponding highest 1h Indoor	7/23/14 17:53	7/25/14 0:29	7/25/14 16:22	7/26/14 7:36	7/27/14 18:39	7/28/14 16:40	7/29/14 17:24		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 7/24/2014 03:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-8-C-4. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 6–100 nm based on difference between concentrations measured using the TSI 3787 CPC and the TSI 3781 CPC with size selector.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	1.1E+4	9.2E+3	8.1E+3	6.4E+3	8.8E+3	1.1E+4	8.8E+3	9.2E+3	1.7E+3
Outdoor 24 SD	4.1E+3	3.4E+3	3.8E+3	2.1E+3	4.9E+3	9.0E+3	4.2E+3	4.5E+3	2.0E+3
Indoor 24h mean	4.4E+2	2.1E+2	1.9E+2	1.9E+2	2.4E+2	2.4E+2	2.2E+2	2.5E+2	8.0E+1
Indoor 24 SD	2.3E+2	1.3E+2	1.3E+2	1.3E+2	2.0E+2	2.0E+2	1.8E+2	1.7E+2	3.8E+1
24h mean In/Out	0.04	0.03	0.02	0.03	0.03	0.02	0.02	0.03	0.01
Highest 8h Outdoor	1.8E+4	1.1E+4	1.2E+4	9.0E+3	1.4E+4	2.2E+4	1.3E+4	1.4E+4	4.2E+3
Highest 8h Indoor	6.9E+2	2.3E+2	1.7E+2	1.6E+2	4.8E+2	4.7E+2	3.9E+2	3.7E+2	1.8E+2
Highest 8 h In/Out	0.04	0.02	0.01	0.02	0.03	0.02	0.03	0.03	0.01
Highest 1h Outdoor	1.8E+4	1.6E+4	1.5E+4	1.1E+4	2.2E+4	3.2E+4	1.8E+4	1.9E+4	6.3E+3
Highest 1 h Indoor ²	6.9E+2	2.3E+2	1.7E+2	1.6E+2	4.8E+2	4.7E+2	3.9E+2	4.5E+2	2.2E+2
Highest 1h In/Out	0.04	0.02	0.01	0.03	0.02	0.02	0.03	0.02	0.01
Time of highest 1h Outdoor	7/23/14 15:45	7/24/14 21:58	7/25/14 7:44	7/26/14 21:57	7/27/14 10:42	7/28/14 11:32	7/29/14 11:31		
Corresponding highest 1h Indoor	7/23/14 17:13	7/25/14 0:29	7/25/14 9:05	7/26/14 22:57	7/27/14 14:42	7/28/14 15:32	7/29/14 15:31		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 7/24/2014 03:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-8-C-5. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 100–300 nm based on difference between concentrations measured using the TSI 3781 CPC with size selector and the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	1.3E+6	1.3E+6	1.4E+6	2.0E+6	1.0E+6	7.8E+5	1.1E+6	1.2E+6	3.5E+5
Outdoor 24 SD	6.1E+5	6.0E+5	4.7E+5	1.5E+6	5.1E+5	4.2E+5	5.8E+5	6.7E+5	3.4E+5
Indoor 24h mean	9.7E+4	5.3E+4	6.0E+4	8.1E+4	6.4E+4	4.3E+4	6.0E+4	6.5E+4	1.7E+4
Indoor 24 SD	5.6E+4	3.9E+4	4.4E+4	5.0E+4	5.9E+4	3.7E+4	5.9E+4	4.9E+4	8.6E+3
24h mean In/Out	0.07	0.06	0.04	0.04	0.06	0.06	0.05	0.05	0.01
Highest 8h Outdoor	2.8E+6	1.6E+6	1.9E+6	3.6E+6	1.6E+6	1.2E+6	1.7E+6	2.1E+6	7.8E+5
Highest 8h Indoor	1.5E+5	5.6E+4	4.7E+4	9.1E+4	1.4E+5	9.1E+4	1.3E+5	1.0E+5	3.8E+4
Highest 8 h In/Out	0.05	0.03	0.03	0.03	0.09	0.07	0.08	0.05	0.02
Highest 1h Outdoor	2.8E+6	2.7E+6	2.1E+6	5.9E+6	1.9E+6	1.8E+6	2.5E+6	2.8E+6	1.3E+6
Highest 1 h Indoor ²	1.5E+5	5.6E+4	4.7E+4	9.1E+4	1.4E+5	9.1E+4	1.3E+5	1.4E+5	4.6E+4
Highest 1h In/Out	0.06	0.03	0.08	0.01	0.09	0.07	0.08	0.06	0.03
Time of highest 1h Outdoor	7/23/14 14:24	7/25/14 0:12	7/25/14 14:00	7/26/14 6:56	7/27/14 18:25	7/28/14 13:44	7/29/14 13:45		
Corresponding highest 1h Indoor	7/23/14 17:53	7/25/14 0:29	7/25/14 16:22	7/26/14 7:36	7/27/14 18:39	7/28/14 16:40	7/29/14 17:24		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 7/24/2014 03:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-8-C-6. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.3–0.4 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	7.2E+3	1.2E+4	1.3E+4	7.0E+4	1.3E+4	1.3E+4	1.8E+4	2.1E+4	2.0E+4
Outdoor 24 SD	5.4E+3	8.4E+3	2.5E+3	7.1E+4	2.7E+3	3.9E+3	4.6E+3	1.4E+4	2.3E+4
Indoor 24h mean	7.3E+2	6.1E+2	8.4E+2	4.1E+3	8.6E+2	7.1E+2	1.0E+3	1.3E+3	1.2E+3
Indoor 24 SD	3.0E+2	3.6E+2	5.6E+2	3.1E+3	5.0E+2	3.3E+2	5.8E+2	8.1E+2	9.3E+2
24h mean In/Out	0.14	0.07	0.05	0.05	0.08	0.06	0.05	0.07	0.03
Highest 8h Outdoor	7.7E+3	1.9E+4	2.1E+4	1.6E+5	1.4E+4	1.7E+4	2.2E+4	3.8E+4	5.2E+4
Highest 8h Indoor	7.3E+2	8.7E+2	7.7E+2	7.2E+3	1.1E+3	9.0E+2	1.2E+3	1.8E+3	2.2E+3
Highest 8 h In/Out	0.09	0.05	0.04	0.04	0.08	0.05	0.05	0.06	0.02
Highest 1h Outdoor	1.3E+4	3.6E+4	2.1E+4	2.0E+5	2.0E+4	1.9E+4	2.8E+4	4.7E+4	6.1E+4
Highest 1 h Indoor ²	7.3E+2	8.7E+2	7.7E+2	7.2E+3	1.1E+3	9.0E+2	1.2E+3	2.1E+3	2.3E+3
Highest 1h In/Out	0.04	0.04	0.05	0.04	0.07	0.08	0.03	0.05	0.02
Time of highest 1h Outdoor	7/23/14 23:55	7/24/14 23:04	7/25/14 23:55	7/26/14 6:47	7/27/14 20:32	7/28/14 13:44	7/29/14 7:52		
Corresponding highest 1h Indoor	7/24/14 1:06	7/25/14 0:29	7/26/14 1:06	7/26/14 7:33	7/27/14 21:50	7/28/14 15:55	7/29/14 8:26		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 7/24/2014 03:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-8-C-7. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.4–0.5 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	1.0E+3	2.0E+3	2.5E+3	1.6E+4	2.4E+3	1.8E+3	2.6E+3	4.0E+3	4.8E+3
Outdoor 24 SD	1.1E+3	2.0E+3	5.3E+2	1.9E+4	5.3E+2	5.7E+2	1.0E+3	3.5E+3	6.3E+3
Indoor 24h mean	1.2E+2	1.0E+2	1.5E+2	5.1E+2	1.4E+2	1.0E+2	1.5E+2	1.8E+2	1.3E+2
Indoor 24 SD	6.9E+1	6.2E+1	9.7E+1	3.3E+2	7.0E+1	3.8E+1	7.5E+1	1.1E+2	9.1E+1
24h mean In/Out	0.20	0.08	0.05	0.03	0.06	0.06	0.05	0.08	0.05
Highest 8h Outdoor	1.1E+3	3.9E+3	4.1E+3	3.9E+4	2.9E+3	2.6E+3	3.2E+3	8.1E+3	1.3E+4
Highest 8h Indoor	1.1E+2	1.6E+2	1.4E+2	8.1E+2	1.6E+2	1.6E+2	1.5E+2	2.4E+2	2.3E+2
Highest 8 h In/Out	0.09	0.04	0.03	0.02	0.05	0.06	0.05	0.05	0.02
Highest 1h Outdoor	2.4E+3	7.7E+3	3.8E+3	6.3E+4	3.9E+3	2.6E+3	5.4E+3	1.3E+4	2.1E+4
Highest 1 h Indoor ²	1.1E+2	1.6E+2	1.4E+2	8.1E+2	1.6E+2	1.6E+2	1.5E+2	2.8E+2	2.7E+2
Highest 1h In/Out	0.03	0.03	0.05	0.01	0.06	0.04	0.03	0.04	0.01
Time of highest 1h Outdoor	7/23/14 23:53	7/24/14 23:04	7/25/14 23:54	7/26/14 7:04	7/27/14 20:41	7/28/14 10:13	7/29/14 7:52		
Corresponding highest 1h Indoor	7/24/14 1:06	7/25/14 0:29	7/26/14 1:05	7/26/14 7:31	7/27/14 21:50	7/28/14 14:13	7/29/14 8:30		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 7/24/2014 03:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-8-C-8. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.5–0.7 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	5.8E+2	1.2E+3	1.6E+3	8.3E+3	2.6E+3	1.6E+3	1.3E+3	2.5E+3	2.5E+3
Outdoor 24 SD	5.6E+2	1.2E+3	5.1E+2	9.3E+3	6.2E+2	7.4E+2	6.9E+2	1.9E+3	3.0E+3
Indoor 24h mean	7.2E+1	5.0E+1	7.4E+1	2.3E+2	1.0E+2	7.2E+1	6.6E+1	9.5E+1	5.6E+1
Indoor 24 SD	6.7E+1	2.9E+1	4.0E+1	1.2E+2	4.3E+1	2.8E+1	3.0E+1	5.1E+1	3.0E+1
24h mean In/Out	0.31	0.07	0.04	0.03	0.04	0.04	0.05	0.08	0.09
Highest 8h Outdoor	6.5E+2	2.3E+3	2.5E+3	1.9E+4	3.2E+3	2.9E+3	1.7E+3	4.7E+3	6.0E+3
Highest 8h Indoor	4.0E+1	7.8E+1	7.5E+1	3.3E+2	1.2E+2	1.1E+2	7.1E+1	1.2E+2	9.0E+1
Highest 8 h In/Out	0.06	0.03	0.03	0.02	0.04	0.04	0.04	0.04	0.01
Highest 1h Outdoor	1.4E+3	4.4E+3	2.7E+3	3.4E+4	3.7E+3	2.8E+3	3.4E+3	7.4E+3	1.1E+4
Highest 1 h Indoor ²	4.0E+1	7.8E+1	7.5E+1	3.3E+2	1.2E+2	1.1E+2	7.1E+1	1.5E+2	1.1E+2
Highest 1h In/Out	0.03	0.03	0.04	0.01	0.04	0.04	0.03	0.03	0.01
Time of highest 1h Outdoor	7/23/14 23:53	7/24/14 23:04	7/26/14 0:20	7/26/14 7:04	7/27/14 23:31	7/28/14 2:00	7/29/14 8:18		
Corresponding highest 1h Indoor	7/24/14 1:11	7/25/14 0:27	7/26/14 1:05	7/26/14 7:36	7/27/14 23:46	7/28/14 2:47	7/29/14 8:31		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 7/24/2014 03:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-8-C-9. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.7–1.0 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	1.6E+2	3.3E+2	4.5E+2	1.9E+3	1.3E+3	6.8E+2	3.6E+2	7.3E+2	5.8E+2
Outdoor 24 SD	7.9E+1	2.2E+2	2.3E+2	1.6E+3	3.8E+2	4.1E+2	1.3E+2	4.3E+2	4.7E+2
Indoor 24h mean	1.9E+1	1.0E+1	1.3E+1	4.1E+1	3.3E+1	2.4E+1	1.4E+1	2.2E+1	1.0E+1
Indoor 24 SD	2.5E+1	4.4E+0	6.0E+0	1.8E+1	1.2E+1	1.5E+1	7.3E+0	1.3E+1	6.9E+0
24h mean In/Out	0.40	0.06	0.03	0.02	0.03	0.03	0.04	0.09	0.13
Highest 8h Outdoor	1.8E+2	4.8E+2	5.9E+2	3.7E+3	1.5E+3	1.5E+3	4.4E+2	1.2E+3	1.1E+3
Highest 8h Indoor	8.2E+0	1.3E+1	2.1E+1	5.5E+1	3.6E+1	3.6E+1	1.7E+1	2.7E+1	1.5E+1
Highest 8 h In/Out	0.05	0.03	0.04	0.02	0.02	0.02	0.04	0.03	0.01
Highest 1h Outdoor	3.1E+2	8.1E+2	8.7E+2	5.9E+3	1.9E+3	1.4E+3	7.3E+2	1.7E+3	1.8E+3
Highest 1 h Indoor ²	8.2E+0	1.3E+1	2.1E+1	5.5E+1	3.6E+1	3.6E+1	1.7E+1	3.6E+1	1.7E+1
Highest 1h In/Out	0.03	0.03	0.03	0.01	0.03	0.03	0.04	0.03	0.01
Time of highest 1h Outdoor	7/24/14 0:28	7/24/14 23:04	7/26/14 1:05	7/26/14 7:04	7/27/14 23:30	7/28/14 2:00	7/29/14 8:19		
Corresponding highest 1h Indoor	7/24/14 1:12	7/25/14 0:27	7/26/14 1:07	7/26/14 7:29	7/27/14 23:46	7/28/14 2:46	7/29/14 8:37		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 7/24/2014 03:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-8-C-10. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 1.0–2.5 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	1.5E+2	3.1E+2	4.2E+2	1.1E+3	9.7E+2	5.0E+2	3.0E+2	5.4E+2	3.4E+2
Outdoor 24 SD	4.8E+1	1.5E+2	2.2E+2	7.1E+2	2.7E+2	2.7E+2	7.0E+1	2.5E+2	2.1E+2
Indoor 24h mean	1.1E+1	5.9E+0	6.8E+0	1.6E+1	1.5E+1	1.6E+1	1.0E+1	1.2E+1	4.0E+0
Indoor 24 SD	2.0E+1	2.6E+0	3.0E+0	6.7E+0	5.5E+0	2.0E+1	1.1E+1	9.8E+0	6.9E+0
24h mean In/Out	0.26	0.03	0.02	0.01	0.02	0.02	0.03	0.06	0.08
Highest 8h Outdoor	1.7E+2	3.7E+2	5.0E+2	1.9E+3	1.1E+3	1.1E+3	3.7E+2	7.9E+2	5.7E+2
Highest 8h Indoor	4.2E+0	6.3E+0	5.4E+0	2.1E+1	1.5E+1	2.7E+1	1.1E+1	1.3E+1	7.9E+0
Highest 8 h In/Out	0.02	0.02	0.01	0.01	0.01	0.02	0.03	0.02	0.01
Highest 1h Outdoor	2.4E+2	5.7E+2	7.2E+2	2.7E+3	1.5E+3	1.0E+3	4.1E+2	1.0E+3	7.9E+2
Highest 1 h Indoor ²	4.2E+0	6.3E+0	5.4E+0	2.1E+1	1.5E+1	2.7E+1	1.1E+1	1.5E+1	6.8E+0
Highest 1h In/Out	0.02	0.02	0.02	0.01	0.02	0.02	0.03	0.02	0.01
Time of highest 1h Outdoor	7/24/14 0:37	7/24/14 23:05	7/26/14 1:12	7/26/14 7:06	7/27/14 23:33	7/28/14 2:08	7/29/14 13:45		
Corresponding highest 1h Indoor	7/24/14 1:08	7/25/14 0:31	7/26/14 1:12	7/26/14 7:33	7/27/14 23:50	7/28/14 2:49	7/29/14 16:53		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 7/24/2014 03:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-8-C-11. Summary statistics for estimated PM_{2.5} concentrations (µg m⁻³) calculated from particle number concentrations resolved by size from 6 nm to 2.5 microns (as reported in Tables SU-8-C-2 to SU-8-C-9) and resulting indoor/outdoor ratios.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	8.1E+0	9.3E+0	1.0E+1	2.4E+1	1.3E+1	9.2E+0	8.8E+0	1.2E+1	5.0E+0
Outdoor 24 SD	2.5E+0	4.1E+0	3.5E+0	1.8E+1	2.5E+0	3.8E+0	3.1E+0	5.3E+0	5.2E+0
Indoor 24h mean	5.8E-1	3.3E-1	3.8E-1	7.6E-1	4.7E-1	3.8E-1	4.1E-1	4.7E-1	1.4E-1
Indoor 24 SD	3.3E-1	2.0E-1	2.4E-1	3.8E-1	3.2E-1	2.1E-1	3.0E-1	2.8E-1	6.2E-2
24h mean In/Out	0.08	0.05	0.03	0.03	0.04	0.04	0.04	0.05	0.02
Highest 8h Outdoor	1.4E+1	1.2E+1	1.4E+1	4.5E+1	1.5E+1	1.4E+1	1.2E+1	1.8E+1	1.1E+1
Highest 8h Indoor	1.3E+0	3.7E-1	3.1E-1	1.0E+0	8.8E-1	5.1E-1	7.6E-1	7.4E-1	3.4E-1
Highest 8 h In/Out	0.09	0.03	0.02	0.02	0.06	0.04	0.06	0.05	0.02
Highest 1h Outdoor	1.4E+1	1.9E+1	1.5E+1	6.8E+1	1.9E+1	1.6E+1	1.5E+1	2.4E+1	1.8E+1
Highest 1 h Indoor ²	1.3E+0	3.7E-1	3.1E-1	1.0E+0	8.8E-1	5.1E-1	7.6E-1	8.8E-1	2.8E-1
Highest 1h In/Out	0.09	0.03	0.03	0.02	0.05	0.05	0.07	0.05	0.02
Time of highest 1h Outdoor	7/23/14 14:23	7/25/14 0:10	7/26/14 0:26	7/26/14 6:57	7/27/14 13:10	7/28/14 13:00	7/29/14 13:45		
Corresponding highest 1h Indoor	7/23/14 14:23	7/25/14 0:29	7/26/14 1:05	7/26/14 7:33	7/27/14 17:10	7/28/14 16:02	7/29/14 17:21		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 7/24/2014 03:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-8-C-12. Summary statistics for concentrations of PM_{2.5} (µg m⁻³) and indoor /outdoor ratios from measurements reported by TSI DustTrak II.

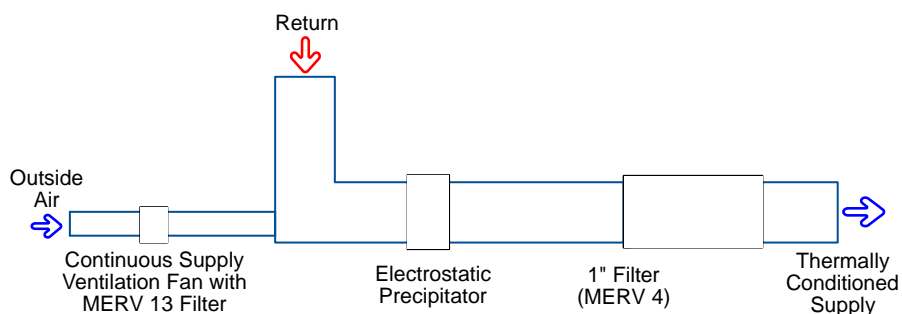
Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	4.1E-3	7.7E-3	9.6E-3	7.6E-2	1.2E-2	8.6E-3	1.1E-2	1.8E-2	2.4E-2
Outdoor 24 SD	7.0E-4	5.3E-3	2.6E-3	9.9E-2	1.8E-3	2.7E-3	2.2E-3	1.6E-2	3.4E-2
Indoor 24h mean	1.1E-3	1.2E-3	1.2E-3	2.1E-3	1.4E-3	1.6E-3	1.1E-3	1.4E-3	3.1E-4
Indoor 24 SD	4.9E-4	8.2E-4	6.5E-4	1.1E-3	1.5E-3	9.7E-4	6.1E-4	8.8E-4	3.3E-4
24h mean In/Out	0.26	0.24	0.13	0.04	0.09	0.15	0.15	0.15	0.07
Highest 8h Outdoor	4.3E-3	1.2E-2	1.4E-2	1.9E-1	1.3E-2	1.2E-2	1.2E-2	3.7E-2	6.4E-2
Highest 8h Indoor	1.2E-3	1.3E-3	1.3E-3	2.9E-3	1.2E-3	2.1E-3	1.1E-3	1.6E-3	6.1E-4
Highest 8 h In/Out	0.28	0.10	0.09	0.01	0.09	0.17	0.09	0.12	0.08
Highest 1h Outdoor	5.0E-3	2.3E-2	1.5E-2	3.6E-1	1.5E-2	1.2E-2	1.4E-2	6.3E-2	1.2E-1
Highest 1 h Indoor ²	1.2E-3	1.3E-3	1.3E-3	2.9E-3	1.2E-3	2.1E-3	1.1E-3	2.5E-3	8.7E-4
Highest 1h In/Out	0.52	0.13	0.16	0.01	0.08	0.31	0.10	0.19	0.16
Time of highest 1h Outdoor	7/24/14 0:28	7/24/14 23:20	7/26/14 0:18	7/26/14 6:59	7/27/14 13:11	7/28/14 10:18	7/29/14 7:53		
Corresponding highest 1h Indoor	7/24/14 0:28	7/25/14 0:12	7/26/14 0:18	7/26/14 7:43	7/27/14 13:11	7/28/14 13:04	7/29/14 9:37		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 7/24/2014 03:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-8-C-13. Daily¹ summary statistics for concentrations (nanograms m⁻³) and indoor /outdoor ratios of aerosol black carbon measured using the Aethalometer AE22.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	2.2E+2	5.2E+2	5.4E+2	8.2E+2	2.2E+2	2.4E+2	3.6E+2	4.2E+2	2.1E+2
Outdoor 24 SD	1.8E+2	5.3E+2	4.6E+2	9.1E+2	9.1E+1	1.2E+2	1.9E+2	3.5E+2	2.8E+2
Indoor 24h mean	2.7E+1	3.2E+1	4.1E+1	4.4E+1	2.8E+1	2.7E+1	3.0E+1	3.3E+1	6.5E+0
Indoor 24 SD	1.8E+1	2.6E+1	3.4E+1	3.4E+1	2.3E+1	2.4E+1	2.5E+1	2.6E+1	5.5E+0
24h mean In/Out	0.16	0.08	0.06	0.06	0.11	0.11	0.10	0.10	0.03
Highest 8h Outdoor	2.4E+2	9.2E+2	1.0E+3	1.8E+3	2.7E+2	3.6E+2	5.7E+2	7.5E+2	5.3E+2
Highest 8h Indoor	2.4E+1	4.5E+1	4.0E+1	6.3E+1	2.3E+1	3.9E+1	4.5E+1	4.0E+1	1.3E+1
Highest 8 h In/Out	0.10	0.05	0.04	0.03	0.08	0.11	0.08	0.07	0.03
Highest 1h Outdoor	5.2E+2	2.0E+3	1.9E+3	3.6E+3	4.4E+2	4.6E+2	6.9E+2	1.4E+3	1.1E+3
Highest 1 h Indoor ²	2.4E+1	4.5E+1	4.0E+1	6.3E+1	2.3E+1	3.9E+1	4.5E+1	4.3E+1	2.2E+1
Highest 1h In/Out	0.05	0.04	0.01	0.02	0.11	0.05	0.04	0.05	0.03
Time of highest 1h Outdoor	7/24/14 0:30	7/24/14 23:45	7/25/14 7:45	7/26/14 6:57	7/27/14 21:54	7/28/14 8:06	7/29/14 8:21		
Corresponding highest 1h Indoor	7/24/14 0:45	7/25/14 0:30	7/25/14 10:06	7/26/14 8:06	7/27/14 23:39	7/28/14 8:48	7/29/14 9:36		

¹ Based on 24h periods starting / ending at 2am. Day 1 starts at 7/24/2014 03:30, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Appendix SU-9-B. Results for System B, July 30-August 6, 2014.**Table SU-9-B-1. Description of System B component characteristics during the period of July 30-August 6, 2014**

System Parameter	Description or Measured Value
Heating	75,000 BTU/h, 80% eff., gas furnace, 1-stage burner
Cooling	3 ton, SEER13 air conditioner
Thermal distribution	Central fan with PSC motor: 1198 cfm for cooling, 1073 cfm for heating
Ventilation	Supply fan discharging into the return plenum. Set to 38 cfm continuous
Filtration	Electrostatic precipitator (ESP, often called electronic air cleaner) Honeywell F300A2025/U installed inside the FAU cabinet. A MERV13, 2" (AirGaurd DPgreen13) installed where the continuous supply air discharges into the return plenum.
Recirculation blower schedule	As required for thermal conditioning, no fan cyclers.
VOC removal system	None

Notes about this monitoring period

We operated for the entire operational period on a single DustTrak instrument. The DustTrak indoor / outdoor data stream was constructed from the single remaining instrument. The majority of the operational period had the indoor DustTrak numbers at the instrument's lower detection limit (LDL). All other instruments were fine.

The 24 h running statistics in the figures starts at 7/31/2014 07:00.

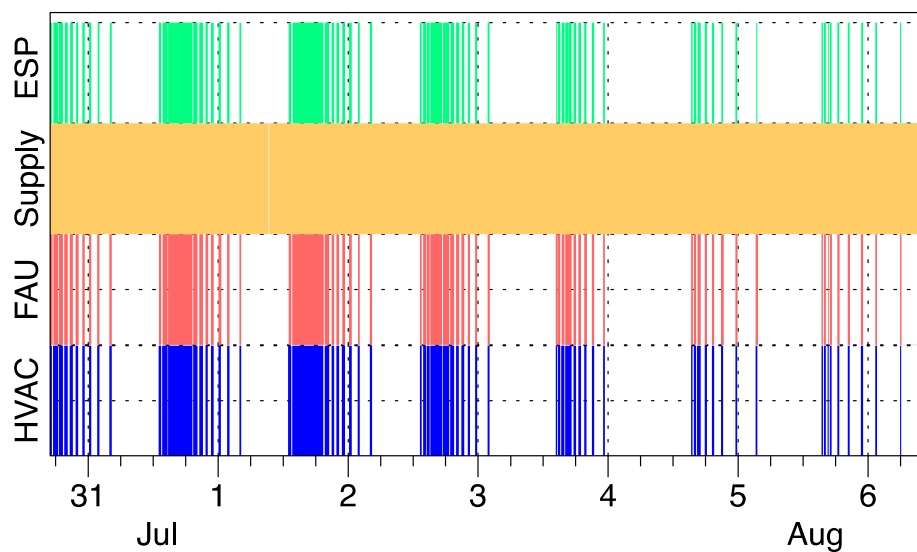


Figure SU-9-B-1. Operation of mechanical systems: ESP filter; Supply fan; fan on central forced air unit (FAU); central air-conditioning (AC).

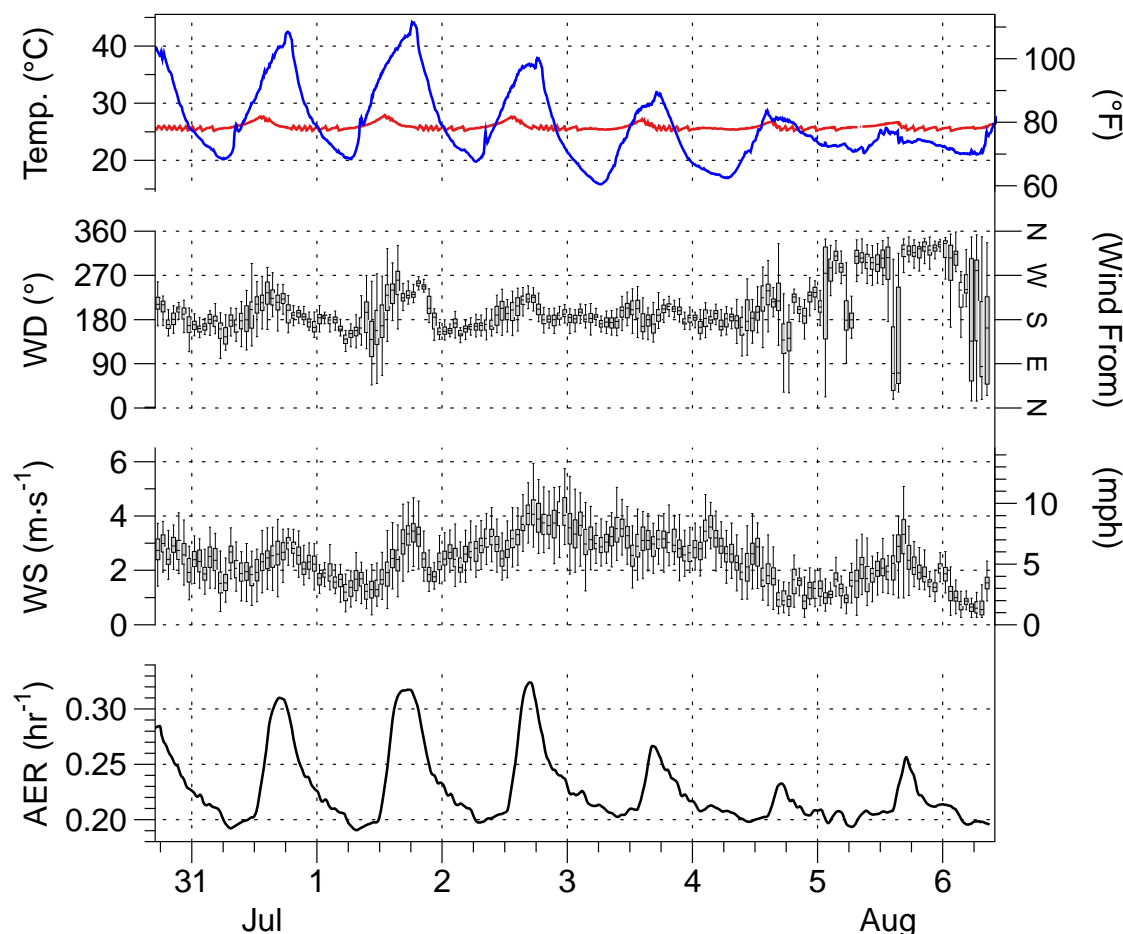


Figure SU-9-B-2. Environmental parameters measured during operation of System B, July 30-August 6, 2014. From top to bottom: indoor (red) and outdoor (blue) temperatures, wind direction (WD) in units of degrees from North, wind speed (WS), and air exchange rate (AER). For WD and WS, the box for each hour shows the 25th, 50th and 75th percentiles of the measured values and whiskers extend 1.5X the interquartile range (75th–25th percentile values) above the 75th and below the 25th percentile values.

Guide to plots of pollutant concentration time series and indoor / outdoor (I/O) ratios

The bottom section of each plot shows outdoor and indoor time series using the resolution of data collection: 3-min for black carbon and 1-min for all other parameters. The top and bottom of grey band are LOESS-smoothed, 1-min (or 3-min for black carbon) time-series. Also shown are time series with 1h and 24h time averaging for most pollutants and 1h and 8h average for ozone. Triangles in bottom of plot indicate the highest 1h outdoor and corresponding highest 1h indoor average during each day. The top section of each plot shows the ratio of indoor to outdoor running 24h mean values (8h for ozone) and the ratios of highest 1h indoor to corresponding highest 1h outdoor concentration each day.

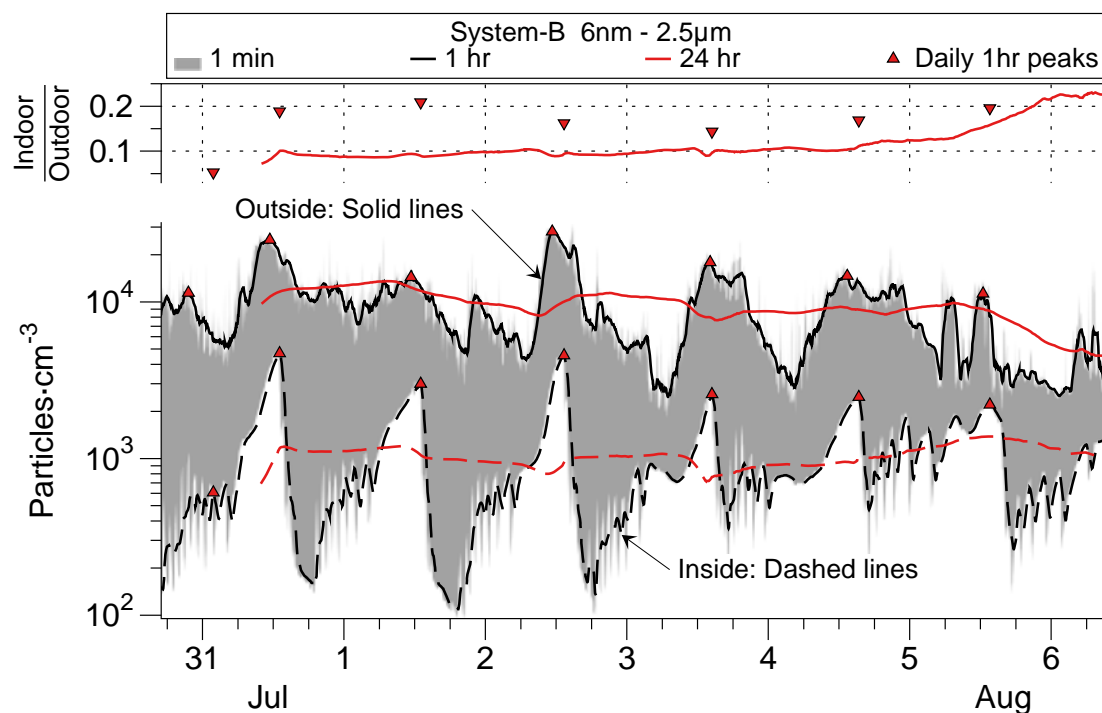


Figure SU-9-B-3. Number concentrations of 6 nm to 2.5 μm diameter particles measured outdoors and indoors during operation of System B, July 30-August 6, 2014. Data collected using TSI 3787 CPCs.

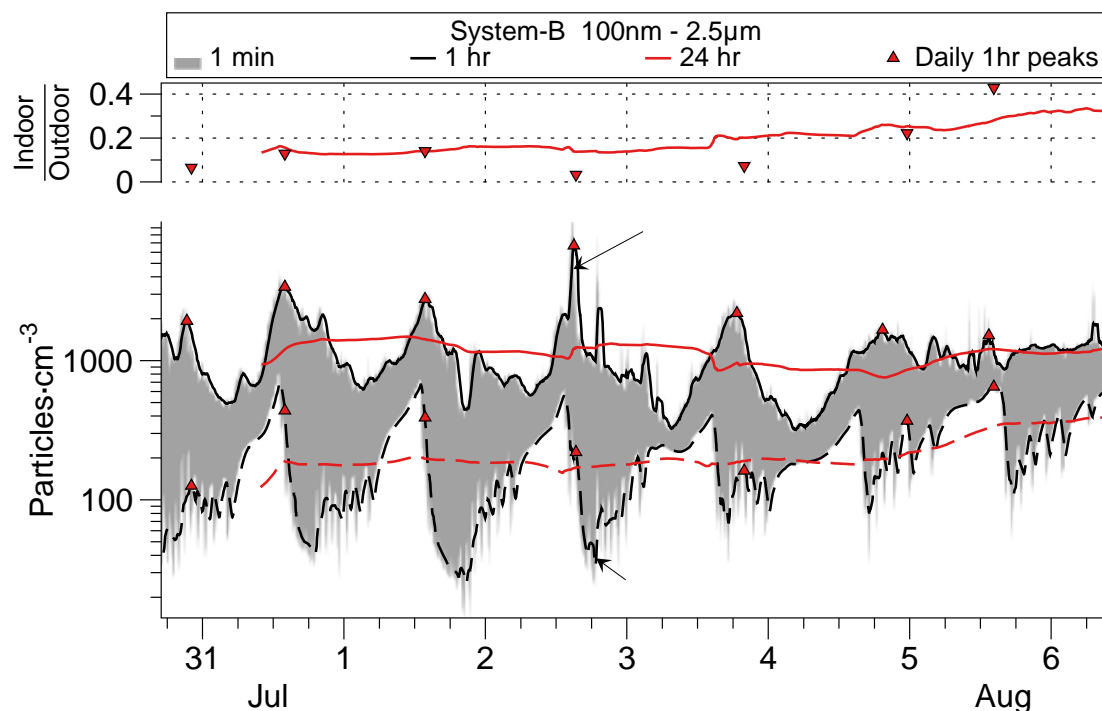


Figure SU-9-B-4. Number concentrations of 100 nm to 2.5 μm diameter particles measured outdoors and indoors during operation of System B, July 30-August 6, 2014. Data collected using TSI 3781 CPCs outfitted with screens to exclude particles smaller than 100 nm. Refer to “Guide” before Figure SU-9-B-3.

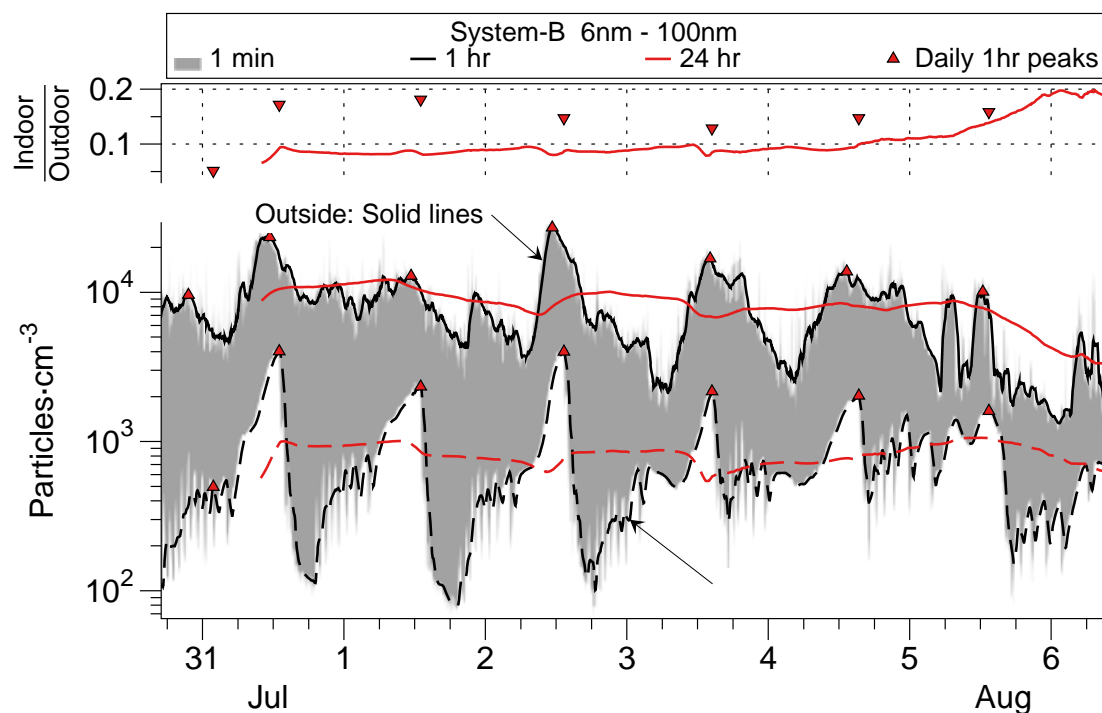


Figure SU-9-B-5. Number concentrations of 6–100 nm diameter particles measured outdoors and indoors during operation of System B, July 30-August 6, 2014. Data obtained as the difference between time series show in prior two figures. Refer to “Guide” before Figure SU-9-B-3.

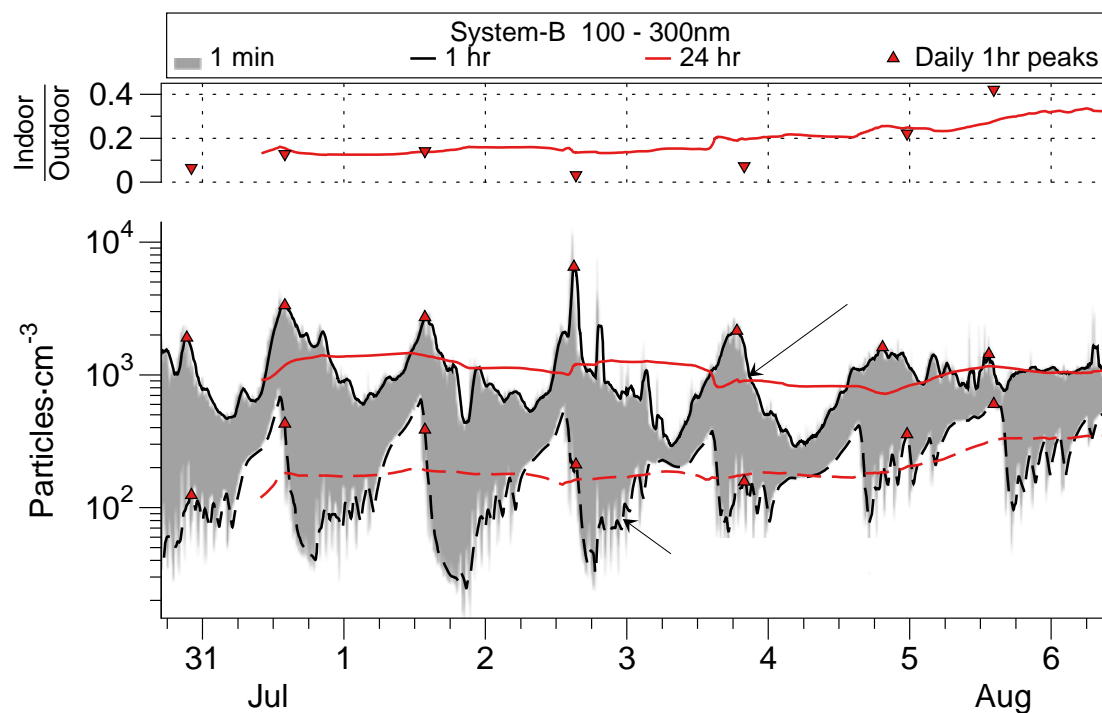


Figure SU-9-B-6. Number concentrations of 100–300 nm diameter particles measured outdoors and indoors during operation of System B, July 30-August 6, 2014. Data obtained as the difference between the TSI 3781 CPC with size selector and the MetOne BT637S OPC. Refer to “Guide” before Figure SU-9-B-3.

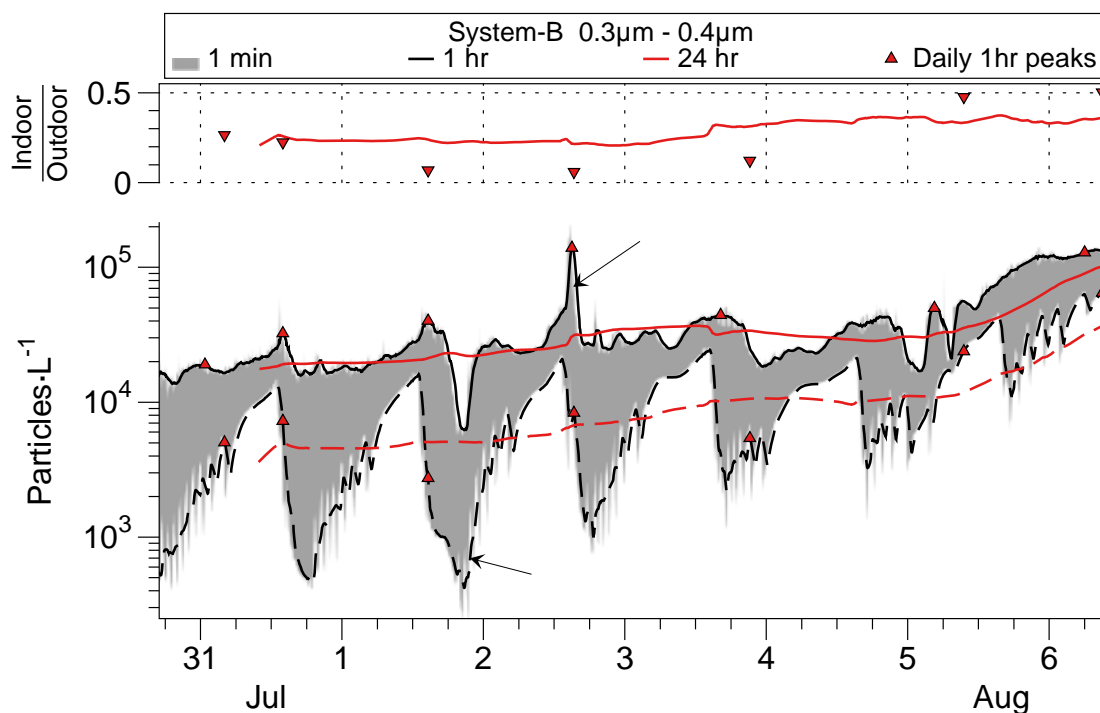


Figure SU-9-B-7. Number concentrations of 0.3–0.4 μm diameter particles measured outdoors and indoors during operation of System B, July 30-August 6, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-9-B-3.

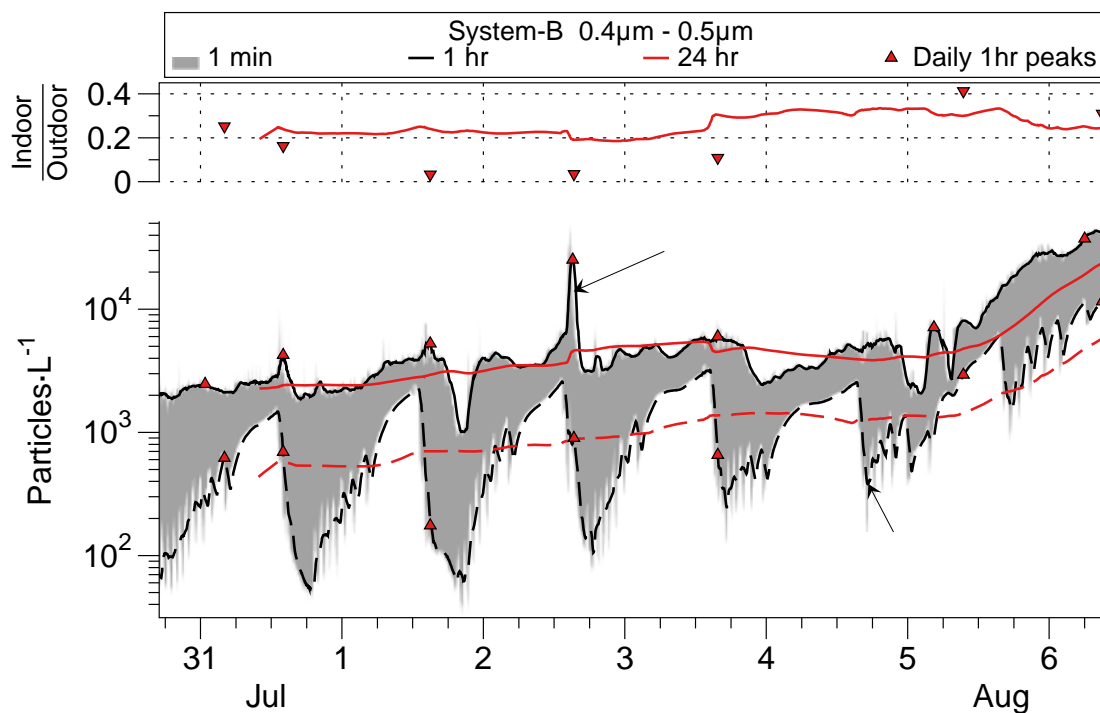


Figure SU-9-B-8. Number concentrations of 0.4–0.5 μm diameter particles measured outdoors and indoors during operation of System B, July 30-August 6, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-9-B-3.

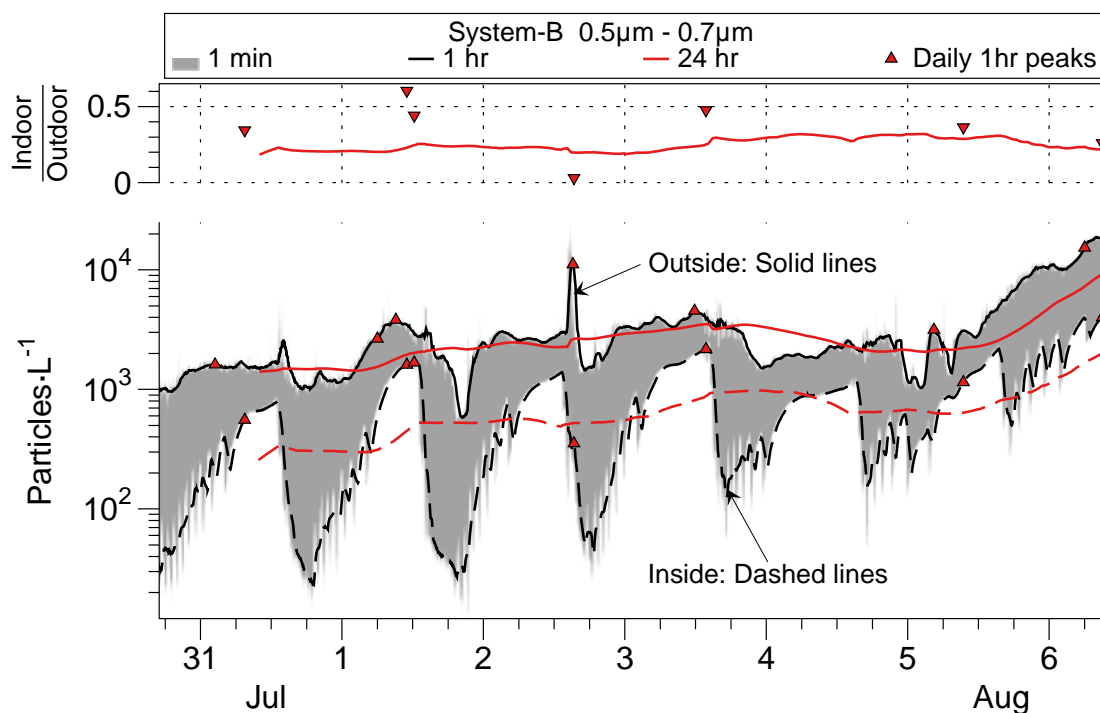


Figure SU-9-B-9. Number concentrations of 0.5–0.7 μm diameter particles measured outdoors and indoors during operation of System B, July 30-August 6, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-9-B-3.

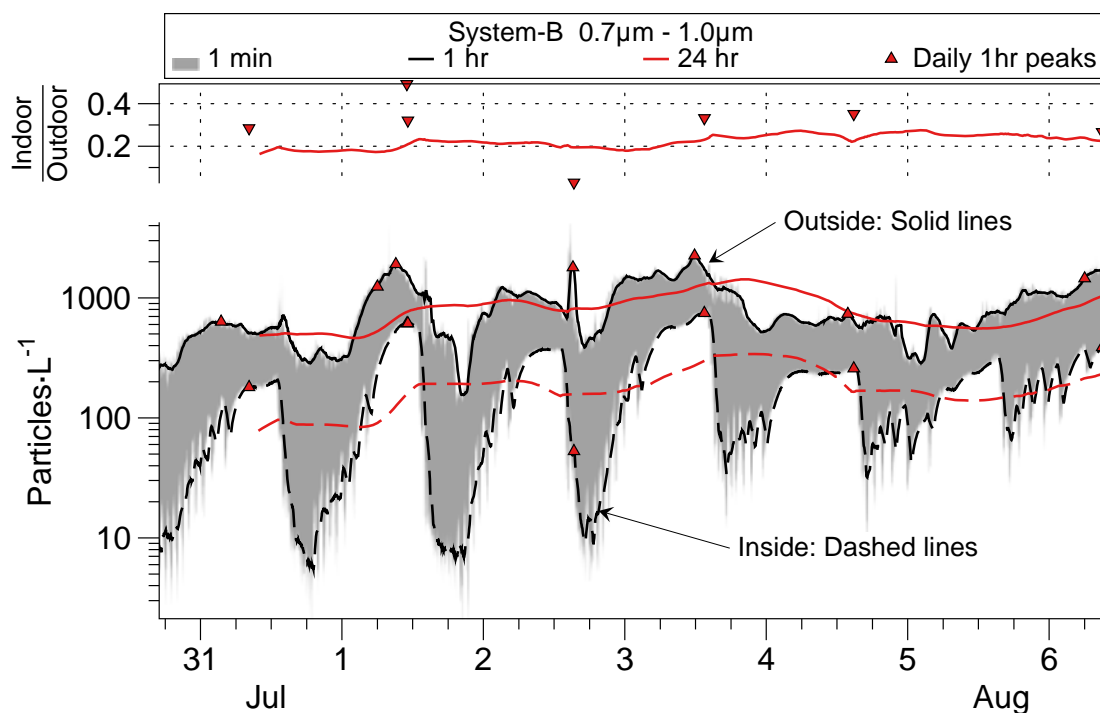


Figure SU-9-B-10. Number concentrations of 0.7–1.0 μm diameter particles measured outdoors and indoors during operation of System B, July 30-August 6, 2014. Data collected using MetOne BT637S particle counters. Refer to “Guide” before Figure SU-9-B-3.

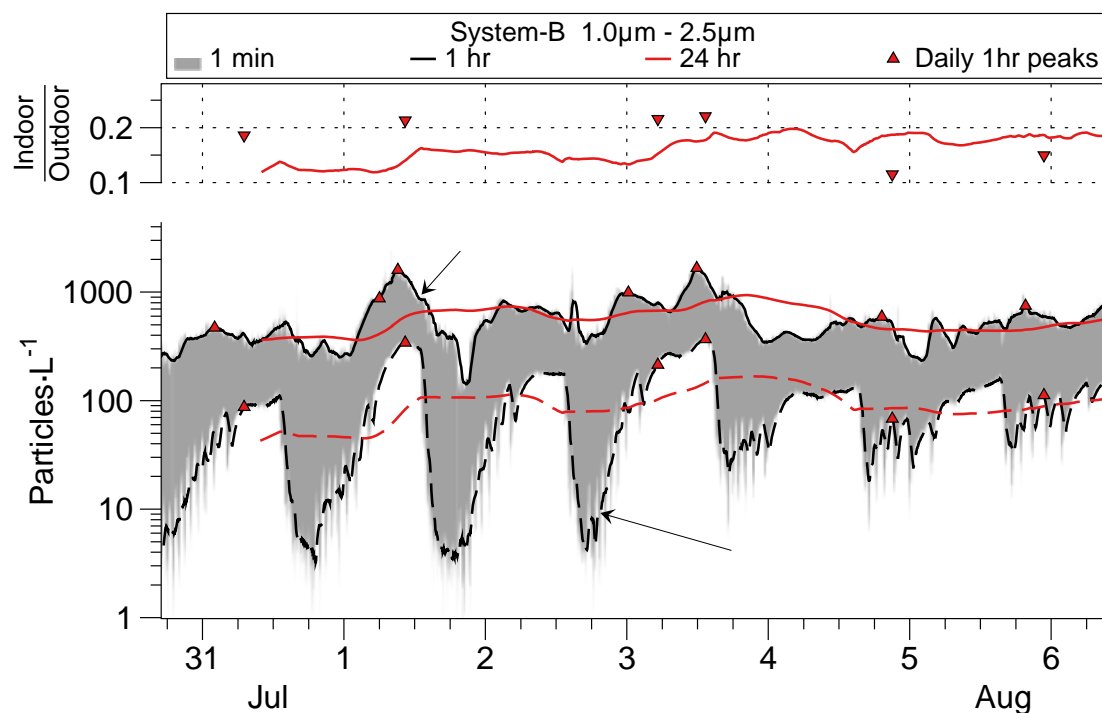


Figure SU-9-B-11. Number concentrations of 1.0–2.5 μm diameter particles measured outdoors and indoors during operation of System B, July 30-August 6, 2014. Data collected using MetOne BT637S particle counters. Refer to Figure SU-9-B-3 for details.

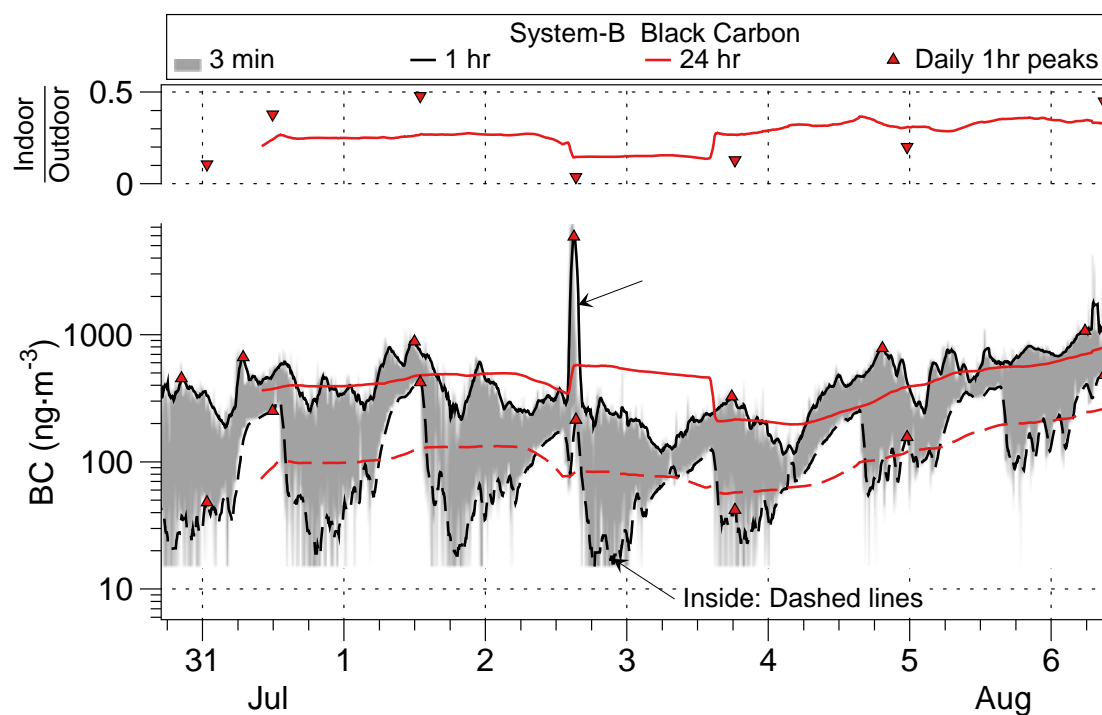


Figure SU-9-B-12. Black carbon concentrations measured outdoors and indoors during operation of System B, July 30-August 6, 2014. Data collected using AE22 Aethalometers with 3-min samples. Data otherwise as described in Figure SU-9-B-3 caption.

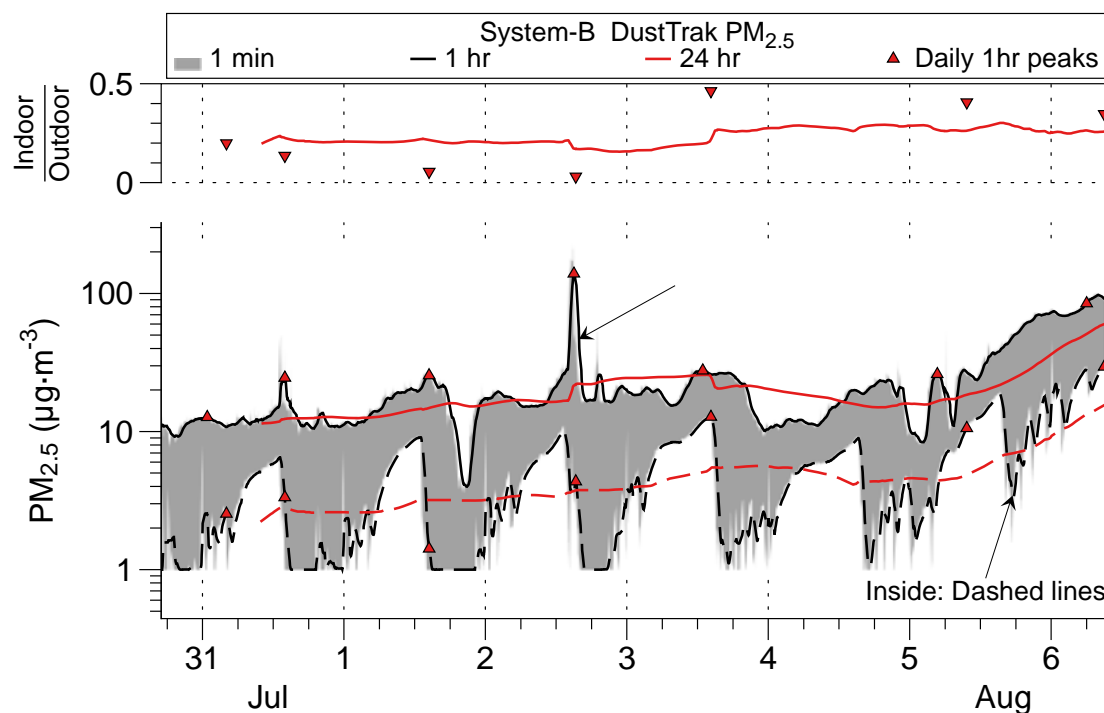


Figure SU-9-B-13. $PM_{2.5}$ reported by TSI DustTrak II 8530 measurements outdoors and indoors during operation of System B, July 30-August 6, 2014. The DustTrak measures light scattering and uses a calibration to estimate $PM_{2.5}$ mass. Refer to “Guide” before Figure SU-9-B-3.

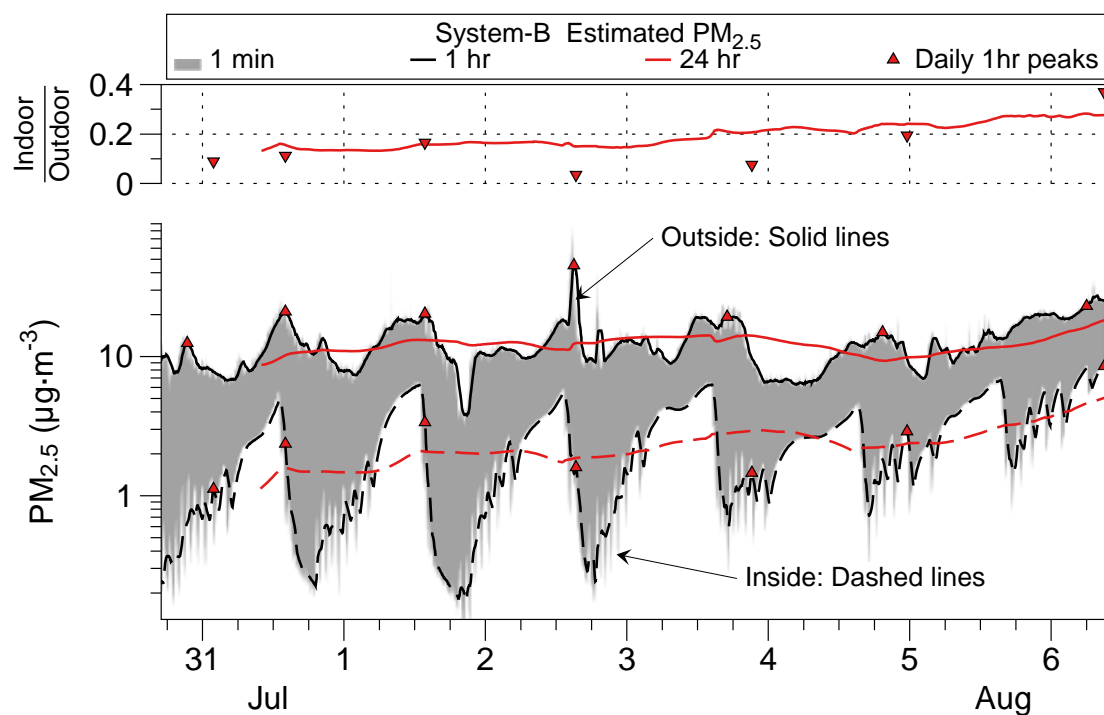


Figure SU-9-B-14. Estimated $PM_{2.5}$ concentration calculated from size-resolved particle number concentrations measured by MetOne and CPC during operation of System B, July 30-August 6, 2014. Details provided in body of report. Refer to “Guide” before Figure SU-9-B-3.

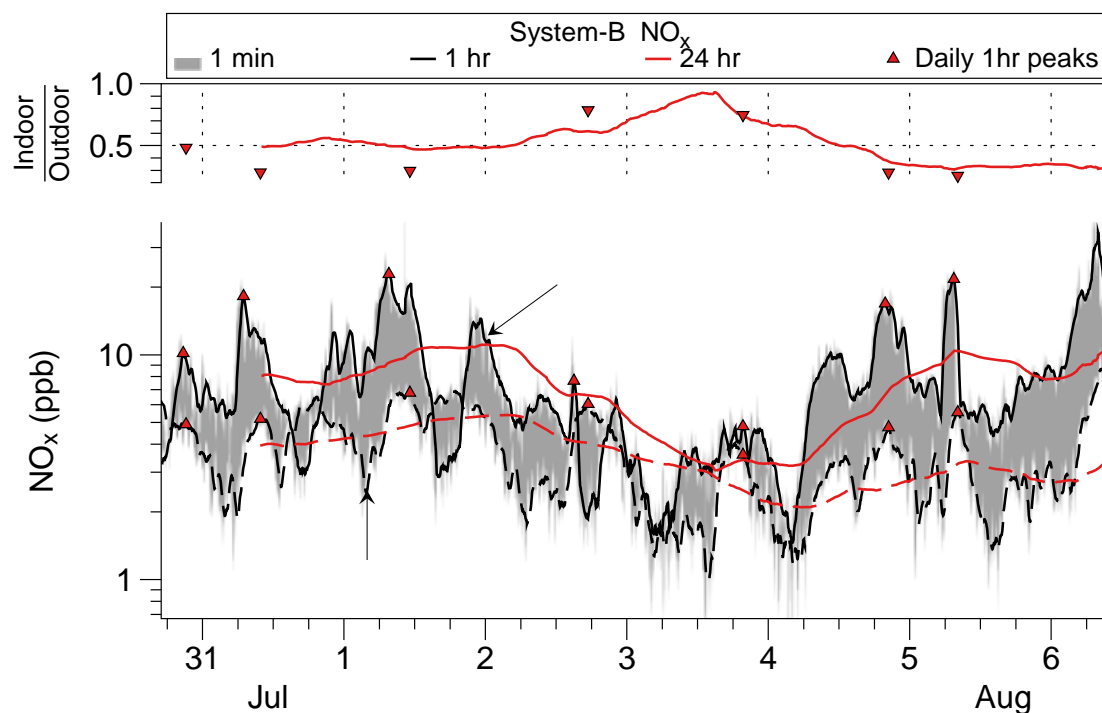


Figure SU-9-B-15. Nitrogen oxides concentrations measured outdoors and indoors during operation of System B, July 30-August 6, 2014. Data collected using API 200A and 200E chemiluminescence analyzers.

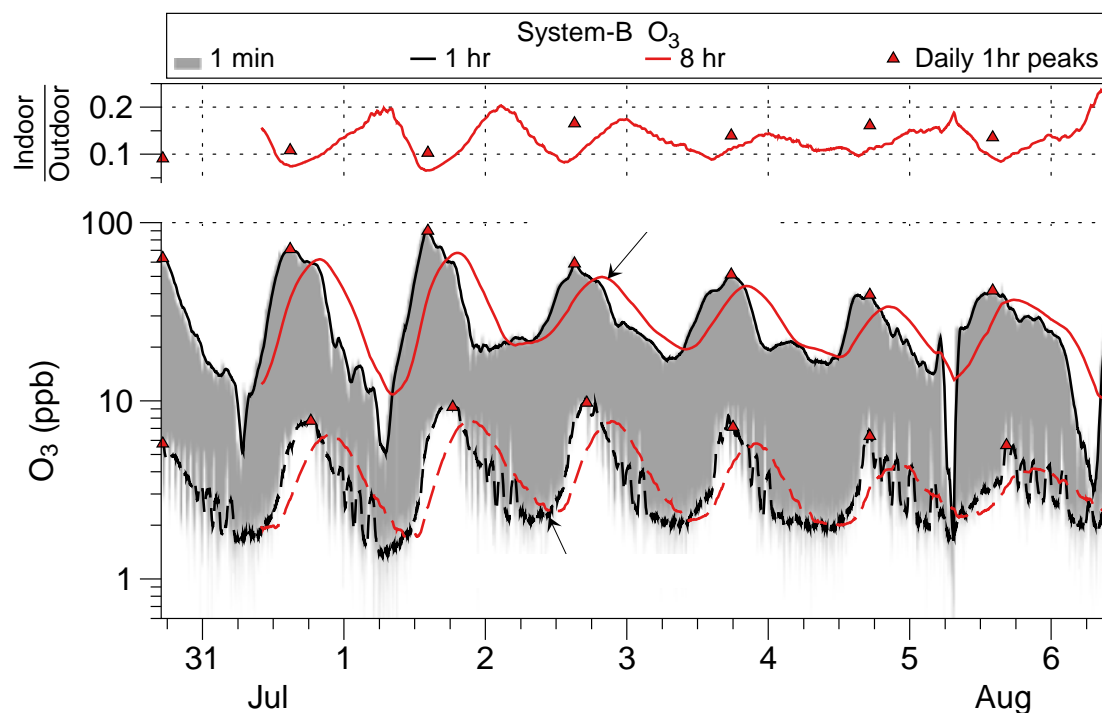


Figure SU-9-B-16. Ozone concentrations measured outdoors and indoors during operation of System B, July 30-August 6, 2014. Data collected using 2B Technologies Model 202 analyzers.

Table SU-9-B-2. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 6 nm to 2.5 micron measured using the TSI 3787 CPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	8.0E+3	1.3E+4	9.0E+3	1.0E+4	8.6E+3	9.6E+3	4.8E+3	9.1E+3	2.4E+3
Outdoor 24 SD	2.6E+3	5.3E+3	3.4E+3	7.9E+3	5.2E+3	3.5E+3	2.9E+3	4.4E+3	1.7E+3
Indoor 24h mean	4.5E+2	1.2E+3	9.2E+2	1.1E+3	9.0E+2	1.2E+3	1.1E+3	9.7E+2	2.4E+2
Indoor 24 SD	2.1E+2	1.2E+3	8.8E+2	1.1E+3	5.0E+2	5.4E+2	6.3E+2	7.3E+2	3.3E+2
24h mean In/Out	0.04	0.09	0.09	0.10	0.10	0.11	0.18	0.10	0.04
Highest 8h Outdoor	9.9E+3	1.9E+4	1.3E+4	2.0E+4	1.5E+4	1.2E+4	7.9E+3	1.4E+4	4.2E+3
Highest 8h Indoor	4.7E+2	2.3E+3	2.0E+3	2.1E+3	1.2E+3	1.5E+3	1.8E+3	1.6E+3	5.8E+2
Highest 8 h In/Out	0.05	0.12	0.16	0.11	0.08	0.12	0.23	0.12	0.05
Highest 1h Outdoor	1.1E+4	2.5E+4	1.4E+4	2.8E+4	1.8E+4	1.5E+4	1.1E+4	1.8E+4	6.1E+3
Highest 1 h Indoor ²	4.7E+2	2.3E+3	2.0E+3	2.1E+3	1.2E+3	1.5E+3	1.8E+3	2.9E+3	1.3E+3
Highest 1h In/Out	0.05	0.19	0.21	0.16	0.14	0.17	0.20	0.16	0.05
Time of highest 1h Outdoor	7/30/14 21:36	7/31/14 11:24	8/1/14 11:22	8/2/14 11:20	8/3/14 14:08	8/4/14 13:23	8/5/14 12:25		
Corresponding highest 1h Indoor	7/31/14 1:49	7/31/14 13:05	8/1/14 13:00	8/2/14 13:20	8/3/14 14:27	8/4/14 15:21	8/5/14 13:35		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 7/31/2014 07:00, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-9-B-3. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 100 nm to 2.5 micron measured using the TSI 3781 CPC with size selector.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	1.0E+3	1.4E+3	1.2E+3	1.3E+3	8.6E+2	1.1E+3	1.2E+3	1.1E+3	1.8E+2
Outdoor 24 SD	4.8E+2	8.3E+2	5.8E+2	1.5E+3	6.0E+2	3.9E+2	2.3E+2	6.6E+2	3.7E+2
Indoor 24h mean	8.9E+1	1.8E+2	1.9E+2	2.0E+2	1.9E+2	2.5E+2	3.9E+2	2.1E+2	8.4E+1
Indoor 24 SD	4.1E+1	1.6E+2	1.8E+2	1.3E+2	8.6E+1	9.3E+1	1.6E+2	1.2E+2	4.6E+1
24h mean In/Out	0.06	0.13	0.15	0.15	0.19	0.23	0.29	0.17	0.07
Highest 8h Outdoor	1.5E+3	2.4E+3	1.8E+3	2.4E+3	1.6E+3	1.4E+3	1.2E+3	1.8E+3	4.2E+2
Highest 8h Indoor	7.4E+1	2.4E+2	2.7E+2	2.2E+2	1.8E+2	2.6E+2	4.4E+2	2.4E+2	1.0E+2
Highest 8 h In/Out	0.05	0.10	0.15	0.09	0.12	0.18	0.35	0.15	0.09
Highest 1h Outdoor	1.9E+3	3.4E+3	2.8E+3	6.7E+3	2.2E+3	1.7E+3	1.5E+3	2.9E+3	1.7E+3
Highest 1 h Indoor ²	7.4E+1	2.4E+2	2.7E+2	2.2E+2	1.8E+2	2.6E+2	4.4E+2	3.4E+2	1.7E+2
Highest 1h In/Out	0.07	0.13	0.14	0.03	0.07	0.22	0.43	0.16	0.13
Time of highest 1h Outdoor	7/30/14 21:21	7/31/14 13:57	8/1/14 13:45	8/2/14 15:00	8/3/14 18:40	8/4/14 19:23	8/5/14 13:24		
Corresponding highest 1h Indoor	7/30/14 22:06	7/31/14 13:57	8/1/14 13:45	8/2/14 15:22	8/3/14 19:54	8/4/14 23:32	8/5/14 14:15		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 7/31/2014 07:00, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-9-B-4. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 6–100 nm based on difference between concentrations measured using the TSI 3787 CPC and the TSI 3781 CPC with size selector.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	7.0E+3	1.2E+4	7.8E+3	9.2E+3	7.7E+3	8.5E+3	3.7E+3	8.0E+3	2.3E+3
Outdoor 24 SD	2.2E+3	5.1E+3	3.1E+3	7.2E+3	4.8E+3	3.4E+3	2.9E+3	4.1E+3	1.6E+3
Indoor 24h mean	3.6E+2	9.8E+2	7.3E+2	8.7E+2	7.1E+2	9.7E+2	7.0E+2	7.6E+2	2.0E+2
Indoor 24 SD	1.8E+2	1.0E+3	7.0E+2	1.0E+3	4.3E+2	4.6E+2	4.9E+2	6.1E+2	3.0E+2
24h mean In/Out	0.03	0.08	0.09	0.09	0.09	0.10	0.16	0.09	0.03
Highest 8h Outdoor	8.4E+3	1.8E+4	1.1E+4	1.8E+4	1.3E+4	1.1E+4	6.8E+3	1.2E+4	3.9E+3
Highest 8h Indoor	3.8E+2	2.0E+3	1.6E+3	1.8E+3	9.8E+2	1.3E+3	1.3E+3	1.3E+3	5.0E+2
Highest 8 h In/Out	0.04	0.11	0.14	0.10	0.07	0.11	0.19	0.11	0.04
Highest 1h Outdoor	9.6E+3	2.3E+4	1.3E+4	2.7E+4	1.7E+4	1.4E+4	1.0E+4	1.6E+4	6.2E+3
Highest 1 h Indoor ²	3.8E+2	2.0E+3	1.6E+3	1.8E+3	9.8E+2	1.3E+3	1.3E+3	2.4E+3	1.2E+3
Highest 1h In/Out	0.05	0.17	0.18	0.15	0.13	0.15	0.16	0.14	0.04
Time of highest 1h Outdoor	7/30/14 21:37	7/31/14 11:24	8/1/14 11:22	8/2/14 11:20	8/3/14 14:08	8/4/14 13:19	8/5/14 12:24		
Corresponding highest 1h Indoor	7/31/14 1:49	7/31/14 13:01	8/1/14 13:00	8/2/14 13:19	8/3/14 14:27	8/4/14 15:21	8/5/14 13:25		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 7/31/2014 07:00, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-9-B-5. Daily¹ summary statistics for number concentration (particles cm⁻³) and indoor /outdoor ratios for particles with aerodynamic diameters 100–300 nm based on difference between concentrations measured using the TSI 3781 CPC with size selector and the MetOne BT637S OPC

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	9.8E+5	1.4E+6	1.1E+6	1.2E+6	8.2E+5	1.0E+6	1.0E+6	1.1E+6	1.8E+5
Outdoor 24 SD	4.8E+5	8.3E+5	5.8E+5	1.4E+6	5.9E+5	3.9E+5	2.1E+5	6.5E+5	3.7E+5
Indoor 24h mean	8.6E+4	1.8E+5	1.8E+5	1.9E+5	1.8E+5	2.3E+5	3.5E+5	2.0E+5	7.3E+4
Indoor 24 SD	4.0E+4	1.5E+5	1.7E+5	1.2E+5	7.8E+4	8.9E+4	1.5E+5	1.2E+5	4.5E+4
24h mean In/Out	0.06	0.13	0.15	0.14	0.19	0.23	0.29	0.17	0.07
Highest 8h Outdoor	1.5E+6	2.4E+6	1.8E+6	2.3E+6	1.5E+6	1.4E+6	1.1E+6	1.7E+6	4.3E+5
Highest 8h Indoor	7.3E+4	2.3E+5	2.6E+5	2.1E+5	1.7E+5	2.6E+5	3.9E+5	2.3E+5	8.9E+4
Highest 8 h In/Out	0.05	0.10	0.15	0.09	0.11	0.19	0.35	0.15	0.09
Highest 1h Outdoor	1.9E+6	3.3E+6	2.7E+6	6.5E+6	2.1E+6	1.6E+6	1.4E+6	2.8E+6	1.6E+6
Highest 1 h Indoor ²	7.3E+4	2.3E+5	2.6E+5	2.1E+5	1.7E+5	2.6E+5	3.9E+5	3.2E+5	1.6E+5
Highest 1h In/Out	0.07	0.13	0.14	0.03	0.07	0.22	0.42	0.15	0.12
Time of highest 1h Outdoor	7/30/14 21:21	7/31/14 13:57	8/1/14 13:44	8/2/14 15:00	8/3/14 18:40	8/4/14 19:23	8/5/14 13:24		
Corresponding highest 1h Indoor	7/30/14 22:06	7/31/14 13:57	8/1/14 13:44	8/2/14 15:22	8/3/14 19:54	8/4/14 23:32	8/5/14 14:15		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 7/31/2014 07:00, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-9-B-6. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.3–0.4 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	1.7E+4	2.0E+4	2.4E+4	3.6E+4	3.1E+4	3.3E+4	9.0E+4	3.6E+4	2.3E+4
Outdoor 24 SD	1.9E+3	4.4E+3	8.2E+3	2.5E+4	9.1E+3	9.8E+3	3.2E+4	1.3E+4	1.0E+4
Indoor 24h mean	2.3E+3	4.6E+3	5.5E+3	8.3E+3	1.1E+4	1.1E+4	3.2E+4	1.1E+4	9.2E+3
Indoor 24 SD	1.5E+3	4.0E+3	4.8E+3	5.6E+3	6.8E+3	5.2E+3	1.4E+4	5.9E+3	3.5E+3
24h mean In/Out	0.07	0.23	0.23	0.22	0.30	0.35	0.34	0.25	0.09
Highest 8h Outdoor	1.8E+4	2.4E+4	3.2E+4	5.2E+4	4.2E+4	4.0E+4	1.2E+5	4.7E+4	3.2E+4
Highest 8h Indoor	7.2E+3	8.8E+3	7.7E+3	8.4E+3	1.3E+4	1.1E+4	5.1E+4	1.5E+4	1.5E+4
Highest 8 h In/Out	0.40	0.37	0.24	0.16	0.30	0.27	0.42	0.31	0.09
Highest 1h Outdoor	1.9E+4	3.2E+4	4.0E+4	1.4E+5	4.4E+4	5.0E+4	1.3E+5	6.5E+4	4.5E+4
Highest 1 h Indoor ²	7.2E+3	8.8E+3	7.7E+3	8.4E+3	1.3E+4	1.1E+4	5.1E+4	1.7E+4	2.1E+4
Highest 1h In/Out	0.27	0.22	0.07	0.06	0.12	0.48	0.50	0.25	0.17
Time of highest 1h Outdoor	7/31/14 0:45	7/31/14 13:57	8/1/14 14:36	8/2/14 15:00	8/3/14 16:15	8/5/14 4:30	8/6/14 6:00		
Corresponding highest 1h Indoor	7/31/14 4:03	7/31/14 13:57	8/1/14 14:36	8/2/14 15:22	8/3/14 21:11	8/5/14 9:30	8/6/14 8:59		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 7/31/2014 07:00, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-9-B-7. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.4–0.5 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	2.2E+3	2.5E+3	3.5E+3	5.2E+3	4.3E+3	4.5E+3	1.9E+4	5.9E+3	5.5E+3
Outdoor 24 SD	2.3E+2	6.7E+2	1.1E+3	5.0E+3	1.3E+3	1.5E+3	1.0E+4	2.8E+3	3.3E+3
Indoor 24h mean	2.8E+2	5.4E+2	7.8E+2	1.1E+3	1.4E+3	1.3E+3	4.8E+3	1.5E+3	1.4E+3
Indoor 24 SD	1.8E+2	4.6E+2	7.1E+2	7.4E+2	9.5E+2	6.5E+2	2.6E+3	9.0E+2	7.3E+2
24h mean In/Out	0.07	0.21	0.23	0.20	0.28	0.32	0.28	0.23	0.08
Highest 8h Outdoor	2.3E+3	2.8E+3	4.1E+3	7.6E+3	5.6E+3	5.2E+3	3.0E+4	8.3E+3	9.1E+3
Highest 8h Indoor	6.9E+2	1.0E+3	1.1E+3	1.6E+3	1.7E+3	1.3E+3	8.9E+3	2.3E+3	2.7E+3
Highest 8 h In/Out	0.30	0.36	0.27	0.21	0.30	0.24	0.30	0.28	0.04
Highest 1h Outdoor	2.5E+3	4.3E+3	5.3E+3	2.5E+4	6.0E+3	7.1E+3	3.7E+4	1.3E+4	1.2E+4
Highest 1 h Indoor ²	6.9E+2	1.0E+3	1.1E+3	1.6E+3	1.7E+3	1.3E+3	8.9E+3	2.5E+3	3.8E+3
Highest 1h In/Out	0.25	0.16	0.03	0.04	0.11	0.41	0.31	0.19	0.13
Time of highest 1h Outdoor	7/31/14 0:46	7/31/14 14:01	8/1/14 14:59	8/2/14 15:08	8/3/14 15:46	8/5/14 4:27	8/6/14 6:00		
Corresponding highest 1h Indoor	7/31/14 4:03	7/31/14 14:01	8/1/14 14:59	8/2/14 15:22	8/3/14 15:46	8/5/14 9:27	8/6/14 8:59		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 7/31/2014 07:00, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-9-B-8. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.5–0.7 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	1.4E+3	1.6E+3	2.5E+3	3.1E+3	2.9E+3	2.2E+3	7.2E+3	3.0E+3	1.8E+3
Outdoor 24 SD	2.6E+2	5.6E+2	9.4E+2	2.1E+3	1.0E+3	6.4E+2	3.9E+3	1.3E+3	1.2E+3
Indoor 24h mean	1.6E+2	3.1E+2	5.7E+2	6.6E+2	9.2E+2	6.3E+2	1.7E+3	7.1E+2	4.6E+2
Indoor 24 SD	1.2E+2	2.7E+2	5.8E+2	4.7E+2	7.1E+2	3.3E+2	8.8E+2	4.8E+2	2.5E+2
24h mean In/Out	0.07	0.20	0.23	0.21	0.27	0.31	0.27	0.22	0.07
Highest 8h Outdoor	1.5E+3	1.7E+3	3.3E+3	3.8E+3	3.9E+3	2.5E+3	1.1E+4	4.0E+3	3.2E+3
Highest 8h Indoor	5.1E+2	9.6E+2	1.2E+3	1.0E+3	1.6E+3	5.7E+2	3.1E+3	1.3E+3	8.0E+2
Highest 8 h In/Out	0.33	0.56	0.38	0.26	0.40	0.23	0.27	0.35	0.10
Highest 1h Outdoor	1.6E+3	2.7E+3	3.8E+3	1.1E+4	4.6E+3	3.2E+3	1.5E+4	6.0E+3	4.8E+3
Highest 1 h Indoor ²	5.1E+2	9.6E+2	1.2E+3	1.0E+3	1.6E+3	5.7E+2	3.1E+3	1.6E+3	1.1E+3
Highest 1h In/Out	0.34	0.60	0.44	0.03	0.48	0.36	0.26	0.36	0.17
Time of highest 1h Outdoor	7/31/14 2:29	8/1/14 6:00	8/1/14 9:08	8/2/14 15:11	8/3/14 11:49	8/5/14 4:26	8/6/14 6:00		
Corresponding highest 1h Indoor	7/31/14 7:29	8/1/14 11:00	8/1/14 12:15	8/2/14 15:22	8/3/14 13:45	8/5/14 9:26	8/6/14 8:59		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 7/31/2014 07:00, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-9-B-9. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 0.7–1.0 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	4.7E+2	5.3E+2	9.5E+2	1.1E+3	1.1E+3	5.8E+2	8.9E+2	8.0E+2	2.5E+2
Outdoor 24 SD	1.4E+2	2.6E+2	5.2E+2	4.5E+2	5.2E+2	1.5E+2	2.8E+2	3.3E+2	1.5E+2
Indoor 24h mean	5.1E+1	9.1E+1	2.0E+2	2.1E+2	3.1E+2	1.5E+2	2.1E+2	1.8E+2	7.9E+1
Indoor 24 SD	4.3E+1	8.1E+1	2.2E+2	1.6E+2	2.6E+2	8.2E+1	8.3E+1	1.3E+2	7.6E+1
24h mean In/Out	0.06	0.17	0.21	0.20	0.24	0.26	0.25	0.20	0.06
Highest 8h Outdoor	5.8E+2	6.7E+2	1.5E+3	1.5E+3	1.7E+3	6.6E+2	1.1E+3	1.1E+3	4.4E+2
Highest 8h Indoor	1.5E+2	3.7E+2	4.9E+2	5.2E+2	6.4E+2	2.4E+2	2.9E+2	3.9E+2	1.6E+2
Highest 8 h In/Out	0.26	0.56	0.33	0.35	0.37	0.36	0.26	0.36	0.09
Highest 1h Outdoor	6.3E+2	1.2E+3	1.9E+3	1.8E+3	2.2E+3	7.3E+2	1.5E+3	1.4E+3	5.6E+2
Highest 1 h Indoor ²	1.5E+2	3.7E+2	4.9E+2	5.2E+2	6.4E+2	2.4E+2	2.9E+2	4.1E+2	2.4E+2
Highest 1h In/Out	0.29	0.49	0.32	0.03	0.33	0.35	0.27	0.30	0.13
Time of highest 1h Outdoor	7/31/14 3:30	8/1/14 6:00	8/1/14 9:08	8/2/14 15:11	8/3/14 11:50	8/4/14 13:49	8/6/14 6:00		
Corresponding highest 1h Indoor	7/31/14 8:14	8/1/14 11:00	8/1/14 11:11	8/2/14 15:22	8/3/14 13:30	8/4/14 14:51	8/6/14 8:59		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 7/31/2014 07:00, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-9-B-10. Daily¹ summary statistics for number concentration (particles L⁻¹) and indoor /outdoor ratios for particles with aerodynamic diameters 1.0–2.5 microns measured with the MetOne BT637S OPC.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	3.6E+2	4.1E+2	7.2E+2	6.8E+2	7.6E+2	4.5E+2	5.2E+2	5.6E+2	1.5E+2
Outdoor 24 SD	8.2E+1	1.7E+2	4.1E+2	2.1E+2	3.9E+2	1.2E+2	1.0E+2	2.1E+2	1.3E+2
Indoor 24h mean	3.0E+1	4.9E+1	1.1E+2	1.1E+2	1.5E+2	7.6E+1	1.0E+2	8.9E+1	3.7E+1
Indoor 24 SD	2.4E+1	4.3E+1	1.2E+2	7.8E+1	1.2E+2	3.9E+1	3.7E+1	6.6E+1	3.8E+1
24h mean In/Out	0.04	0.12	0.15	0.14	0.18	0.18	0.18	0.14	0.05
Highest 8h Outdoor	4.2E+2	5.0E+2	1.2E+3	8.8E+2	1.2E+3	5.4E+2	6.2E+2	7.6E+2	3.0E+2
Highest 8h Indoor	7.3E+1	2.1E+2	2.7E+2	2.3E+2	2.4E+2	6.9E+1	9.3E+1	1.7E+2	8.1E+1
Highest 8 h In/Out	0.18	0.43	0.23	0.26	0.20	0.13	0.15	0.22	0.09
Highest 1h Outdoor	4.7E+2	8.8E+2	1.6E+3	9.9E+2	1.7E+3	5.9E+2	7.5E+2	9.9E+2	4.4E+2
Highest 1 h Indoor ²	7.3E+1	2.1E+2	2.7E+2	2.3E+2	2.4E+2	6.9E+1	9.3E+1	2.2E+2	1.2E+2
Highest 1h In/Out	0.19	0.39	0.21	0.22	0.22	0.12	0.15	0.21	0.08
Time of highest 1h Outdoor	7/31/14 2:03	8/1/14 6:00	8/1/14 9:08	8/3/14 0:15	8/3/14 11:52	8/4/14 19:16	8/5/14 19:39		
Corresponding highest 1h Indoor	7/31/14 7:03	8/1/14 10:24	8/1/14 10:24	8/3/14 5:15	8/3/14 13:20	8/4/14 21:02	8/5/14 22:46		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 7/31/2014 07:00, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-9-B-11. Summary statistics for estimated PM_{2.5} concentrations (µg m⁻³) calculated from particle number concentrations resolved by size from 6 nm to 2.5 microns (as reported in Tables SU-9-B-2 to SU-9-B-9) and resulting indoor/outdoor ratios.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	8.6E+0	1.2E+1	1.3E+1	1.4E+1	1.2E+1	1.1E+1	1.6E+1	1.2E+1	2.2E+0
Outdoor 24 SD	1.8E+0	3.8E+0	4.7E+0	8.2E+0	5.3E+0	2.7E+0	4.1E+0	4.4E+0	1.9E+0
Indoor 24h mean	7.7E-1	1.5E+0	2.1E+0	2.3E+0	2.8E+0	2.4E+0	4.6E+0	2.4E+0	1.1E+0
Indoor 24 SD	4.4E-1	1.3E+0	2.1E+0	1.5E+0	1.8E+0	9.7E-1	1.7E+0	1.4E+0	5.2E-1
24h mean In/Out	0.05	0.13	0.16	0.16	0.20	0.23	0.26	0.17	0.06
Highest 8h Outdoor	1.0E+1	1.5E+1	1.8E+1	1.9E+1	1.8E+1	1.3E+1	2.0E+1	1.6E+1	3.4E+0
Highest 8h Indoor	4.5E-1	2.0E+0	4.4E+0	3.3E+0	3.3E+0	2.3E+0	6.5E+0	3.2E+0	1.8E+0
Highest 8 h In/Out	0.05	0.13	0.24	0.18	0.18	0.17	0.32	0.18	0.08
Highest 1h Outdoor	1.2E+1	2.1E+1	2.0E+1	4.5E+1	1.9E+1	1.5E+1	2.3E+1	2.2E+1	9.9E+0
Highest 1 h Indoor ²	4.5E-1	2.0E+0	4.4E+0	3.3E+0	3.3E+0	2.3E+0	6.5E+0	3.0E+0	2.4E+0
Highest 1h In/Out	0.09	0.11	0.17	0.04	0.08	0.19	0.37	0.15	0.10
Time of highest 1h Outdoor	7/30/14 21:25	7/31/14 14:03	8/1/14 13:44	8/2/14 15:00	8/3/14 17:01	8/4/14 19:23	8/6/14 6:00		
Corresponding highest 1h Indoor	7/31/14 1:51	7/31/14 14:03	8/1/14 13:44	8/2/14 15:22	8/3/14 21:11	8/4/14 23:32	8/6/14 8:59		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 7/31/2014 07:00, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-9-B-12. Summary statistics for concentrations of PM_{2.5} (µg m⁻³) and indoor /outdoor ratios from measurements reported by TSI DustTrak II.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	1.1E-2	1.3E-2	1.7E-2	2.5E-2	1.8E-2	1.7E-2	5.1E-2	2.2E-2	1.3E-2
Outdoor 24 SD	1.1E-3	3.6E-3	5.3E-3	2.6E-2	6.5E-3	5.5E-3	2.1E-2	1.0E-2	9.1E-3
Indoor 24h mean	1.6E-3	2.6E-3	3.4E-3	4.4E-3	5.3E-3	4.5E-3	1.3E-2	5.0E-3	3.6E-3
Indoor 24 SD	8.8E-4	1.9E-3	2.8E-3	2.8E-3	3.8E-3	2.4E-3	6.6E-3	3.0E-3	1.7E-3
24h mean In/Out	0.12	0.20	0.21	0.18	0.24	0.28	0.27	0.22	0.05
Highest 8h Outdoor	1.2E-2	1.5E-2	2.1E-2	3.9E-2	2.6E-2	2.1E-2	7.3E-2	3.0E-2	2.0E-2
Highest 8h Indoor	3.2E-3	4.1E-3	4.7E-3	4.1E-3	6.8E-3	3.1E-3	2.2E-2	6.9E-3	6.3E-3
Highest 8 h In/Out	0.27	0.28	0.22	0.11	0.26	0.15	0.30	0.23	0.07
Highest 1h Outdoor	1.3E-2	2.4E-2	2.6E-2	1.4E-1	2.8E-2	2.6E-2	8.5E-2	4.9E-2	4.3E-2
Highest 1 h Indoor ²	3.2E-3	4.1E-3	4.7E-3	4.1E-3	6.8E-3	3.1E-3	2.2E-2	9.2E-3	9.2E-3
Highest 1h In/Out	0.20	0.14	0.06	0.03	0.46	0.41	0.35	0.23	0.16
Time of highest 1h Outdoor	7/31/14 0:48	7/31/14 13:58	8/1/14 14:27	8/2/14 15:00	8/3/14 12:52	8/5/14 4:40	8/6/14 6:00		
Corresponding highest 1h Indoor	7/31/14 4:03	7/31/14 13:58	8/1/14 14:27	8/2/14 15:20	8/3/14 14:15	8/5/14 9:40	8/6/14 8:59		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 7/31/2014 07:00, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Table SU-9-B-13. Daily¹ summary statistics for concentrations (nanograms m⁻³) and indoor /outdoor ratios of aerosol black carbon measured using the Aethalometer AE22.

Parameter	Day 1 ¹	Day 2 ¹	Day 3	Day 4	Day 5	Day 6	Day 7	Mean ¹	SD ¹
Outdoor 24h mean	3.3E+2	4.1E+2	4.8E+2	5.0E+2	2.0E+2	4.7E+2	7.1E+2	4.4E+2	1.5E+2
Outdoor 24 SD	1.1E+2	1.2E+2	2.1E+2	1.2E+3	6.6E+1	1.6E+2	1.7E+2	3.0E+2	3.8E+2
Indoor 24h mean	3.8E+1	1.0E+2	1.3E+2	7.7E+1	6.4E+1	1.3E+2	2.5E+2	1.1E+2	6.3E+1
Indoor 24 SD	2.0E+1	9.0E+1	1.3E+2	6.0E+1	3.4E+1	5.8E+1	1.1E+2	7.2E+1	3.7E+1
24h mean In/Out	0.10	0.23	0.27	0.18	0.24	0.32	0.34	0.24	0.08
Highest 8h Outdoor	3.9E+2	5.1E+2	7.2E+2	1.1E+3	2.7E+2	6.0E+2	8.3E+2	6.3E+2	2.5E+2
Highest 8h Indoor	8.3E+1	2.2E+2	2.9E+2	1.5E+2	6.1E+1	1.1E+2	3.3E+2	1.8E+2	9.5E+1
Highest 8 h In/Out	0.21	0.42	0.40	0.14	0.23	0.18	0.39	0.28	0.11
Highest 1h Outdoor	4.5E+2	6.6E+2	8.8E+2	5.9E+3	3.3E+2	7.8E+2	1.1E+3	1.4E+3	1.8E+3
Highest 1 h Indoor ²	8.3E+1	2.2E+2	2.9E+2	1.5E+2	6.1E+1	1.1E+2	3.3E+2	2.3E+2	1.6E+2
Highest 1h In/Out	0.11	0.38	0.48	0.04	0.13	0.20	0.45	0.25	0.17
Time of highest 1h Outdoor	7/30/14 20:24	7/31/14 6:54	8/1/14 11:57	8/2/14 15:00	8/3/14 17:48	8/4/14 19:21	8/6/14 5:45		
Corresponding highest 1h Indoor	7/31/14 0:45	7/31/14 11:54	8/1/14 12:57	8/2/14 15:21	8/3/14 18:21	8/4/14 23:33	8/6/14 8:57		

¹ Based on 24h periods starting / ending at 6am. Day 1 starts at 7/31/2014 07:00, and has < 24h of data. ²Occurring within 4h of highest 1h outdoor concentration.

Appendix SU-10-VOC. Results for VOC removal in Systems G, C, D and Reference, June – July 2014

Table SU-10-VOC-1. Summary of VOC results

	Concentration REFERENCE (µg/m³)				I/O ratio								Indoor or Outdoor Sources?	%ΔC (indoors)						%ΔC (indoors outdoors)					
	outdoor		indoor		w / S				no S					w / S			no S			w / S			no S		
	w / S	no S	w / S	no S	REF	G	D	C	REF	G	D	C		G	D	C	G	D	C	G	D	C	G	D	C
ALKANES																									
Heptane	0.12	0.09	0.28	0.25	2.3	1.3	1.2	2.0	2.7	2.4	1.5	2.8	both	-30%	-35%	12%	-32%	-31%	23%	-69%	-84%	-1%	-36%	-63%	28%
Octane	0.12	0.06	0.26	0.22	2.1	1.6	1.4	1.9	3.9	7.9	2.5	4.7	both	22%	-22%	3%	17%	-25%	11%	-12%	-62%	-5%	37%	-40%	18%
Decane	0.21	0.05	0.34	0.28	1.6	1.3	0.9	3.2	5.9	no O	no O	no O	outdoor	60%	-32%	134%	29%	-51%	155%	-15%	-127%	317%	55%	-41%	206%
Dodecane	0.26	0.01	0.54	0.34	2.1	1.4	1.3	5.6	45.5	79.0	27.6	258.1	both	75%	32%	380%	53%	-26%	761%	-6%	-43%	667%	55%	-27%	777%
AROMATICS																									
Benzene	0.15	0.16	0.23	0.22	1.5	1.8	0.9	1.3	1.4	1.7	0.9	1.6	outdoor	-31%	35%	-8%	-36%	47%	9%	-10%	-135%	-38%	-5%	-156%	61%
Toluene	0.52	0.44	5.70	5.51	11.1	7.3	4.3	9.4	12.4	14.7	5.7	11.8	indoor	-25%	-44%	15%	-25%	-40%	19%	-29%	-53%	13%	-24%	-46%	18%
Ethylbenzene	0.11	0.08	0.62	0.59	5.6	4.5	2.8	11.6	7.0	4.6	3.0	492.9	indoor	-27%	-36%	-15%	-28%	-52%	-14%	-31%	-51%	-6%	-34%	-62%	0%
m/p-Xylene	0.34	0.27	1.31	1.27	3.9	3.2	1.8	4.0	4.8	3.7	2.1	7.4	both	-30%	-43%	-11%	-31%	-55%	-9%	-35%	-65%	-10%	-37%	-71%	-1%
o-Xylene	0.13	0.10	0.95	0.92	7.4	4.3	2.2	7.4	9.2	8.3	4.1	12.6	indoor	-29%	-49%	-9%	-30%	-53%	-6%	-37%	-67%	-9%	-31%	-60%	-3%
Benzene, 1,2,4-trimethyl-	0.19	0.07	0.32	0.22	1.7	0.8	0.9	1.4	3.1	4.4	1.5	3.0	outdoor	2%	-31%	5%	-24%	-55%	10%	-156%	-121%	-32%	-13%	-78%	9%
Benzene, 1,2,3-trimethyl-	0.04	0.02	0.08	0.06	1.9	0.9	1.0	1.5	3.3	4.3	1.7	2.9	outdoor	0%	-33%	5%	-30%	-53%	4%	-127%	-105%	-29%	-23%	-73%	-2%
Benzaldehyde	0.20	0.08	2.34	2.30	11.8	8.1	4.0	9.3	29.9	109.2	11.3	62.1	indoor	-26%	-51%	-25%	-25%	-48%	-23%	-30%	-60%	-27%	-23%	-51%	-22%
Phenol	0.21	0.02	3.19	3.18	14.9	20.2	8.0	7.6	130.0	-46.5	13.8	-16.7	indoor	-15%	-15%	-16%	-12%	-12%	-16%	-14%	-20%	-21%	-10%	-18%	-10%
CARBONYLS																									
Formaldehyde*	2.71		116		42.8	26.3	26.6	22.7					indoor	-7%	-5%	-15%				-8%	-7%	-17%			
Acetaldehyde*	1.86		19.2		10.4	7.7	7.4	7.8					indoor	-4%	-21%	-5%				-8%	-24%	-9%			
Acetone*	3.17		20.0		6.3	4.1	3.0	3.3					indoor	3%	-25%	-2%				-7%	-40%	-19%			
Butanal	0.19	0.14	2.37	2.62	12.6	12.3	9.1	12.4	19.0	25.2	13.7	16.7	indoor	-18%	-5%	-10%	-14%	3%	-16%	-18%	-9%	-10%	-13%	1%	-17%
Hexanal	1.50	0.36	89.2	87.1	59.4	30.3	30.3	34.8	238.8	328.6	141.6	232.6	indoor	-27%	-51%	-27%	-27%	-46%	-29%	-26%	-51%	-26%	-27%	-46%	-29%
Octanal	0.23	0.03	5.01	4.89	21.9	12.2	15.4	11.0	163.4	111.0	37.2	441.7	indoor	-3%	-41%	-8%	-7%	-37%	-5%	-7%	-42%	-12%	-7%	-38%	-4%
Nonanal	0.26	0.01	0.54	0.34	6.0	2.9	5.1	3.8	74.6	65.4	24.7	465.9	indoor	23%	-9%	14%	21%	2%	24%	-4%	-12%	1%	21%	-1%	25%
ALCOHOLS																									
2-Butoxyethanol	0.80	0.07	9.74	9.61	12.2	29.2	93.1	7.1	145.4	no O	no O	no O	indoor	-24%	-29%	-23%	-19%	-26%	-24%	-20%	-23%	-27%	-19%	-26%	-23%
1-Hexanol, 2-ethyl-	0.23	0.05	5.26	4.95	23.0	7.6	8.5	16.3	96.0	822.1	16.7	no O	indoor	-18%	-28%	-8%	-25%	-37%	-9%	-25%	-33%	-9%	-25%	-41%	-8%
ALKENES																									
α-Pinene	0.16	0.05	13.0	12.8	80.4	13.6	24.2	39.6					indoor	-31%	-57%	-15%				-35%	-58%	-16%			
Styrene	0.07	0.02	1.31	1.25	18.8	10.8	3.6	20.1					indoor	49%	-48%	20%				43%	-60%	20%			
3-Carene	0.01	0.00	0.31	0.31	22.7	5.6	7.5	15.1					indoor	-31%	-61%	-16%				-41%	-64%	-18%			
D-Limonene	0.09	0.04	1.18	1.22	13.0	no O	4.9	10.9					indoor	-48%	-59%	-13%				-43%	-65%	-15%			
g-Terpinene	0.01	0.00	0.06	0.07	5.5	4.2	no O	14.3					indoor	-36%	-59%	-5%				-41%	-50%	8%			
SILOXANES																									
Cyclotrisiloxane, hexamethyl-	0.40	0.44	2.83	3.53	7.0	6.8	2.2	9.7	8.1	19.8	2.6	91.1	indoor	-28%	-29%	-19%	-41%	-45%	-30%	-28%	-54%	-15%	-36%	-61%	-22%
Cyclotetrasiloxane, octamethyl-	0.06	0.05	0.46	0.46	7.3	7.2	2.5	9.5	9.6	29.9	4.3	42.3	indoor	27%	-21%	6%	9%	-30%	15%	27%	-45%	10%	17%	-40%	25%
Cyclopentasiloxane, decamethyl-	0.10	0.03	2.53	2.64	24.5	40.8	15.9	41.5	89.3	513.4	231.0	559.2	indoor	896%	280%	1396%	858%	341%	1395%	913%	271%	1422%	867%	344%	1409%
TOTAL Concentration (µg/m³)	14.5	2.7	304.9	147.2																					

* Determined by the DNPH/HPLC method

no O: not detected outdoors

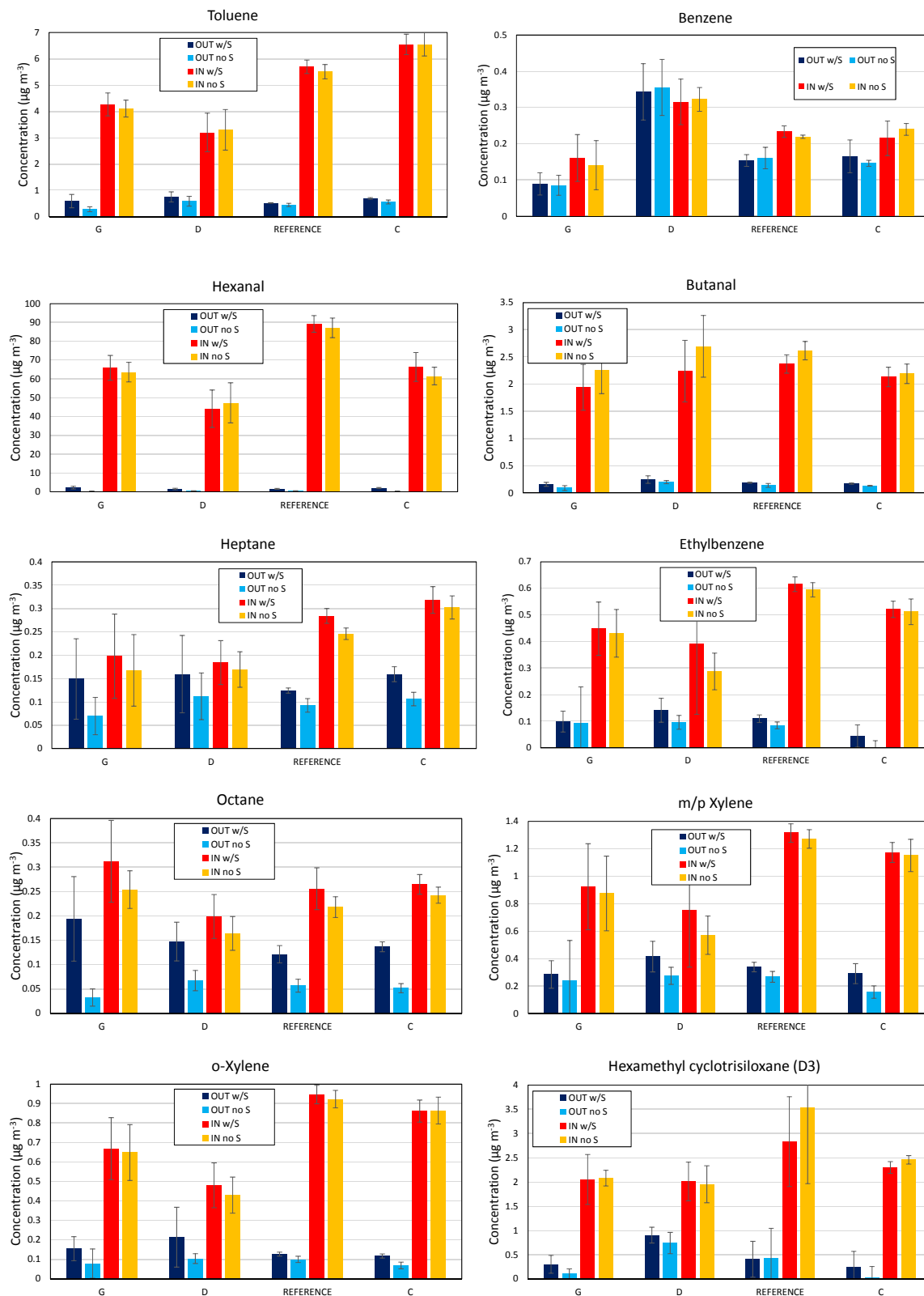
values highlighted in grey: significant losses in outdoor samples without scrubber

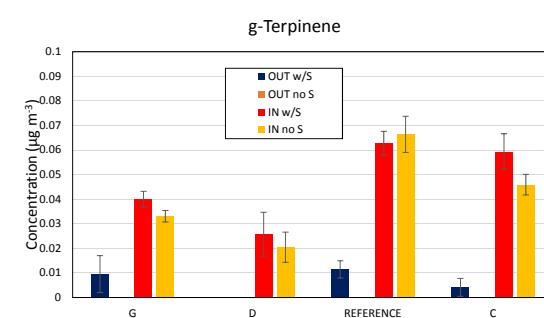
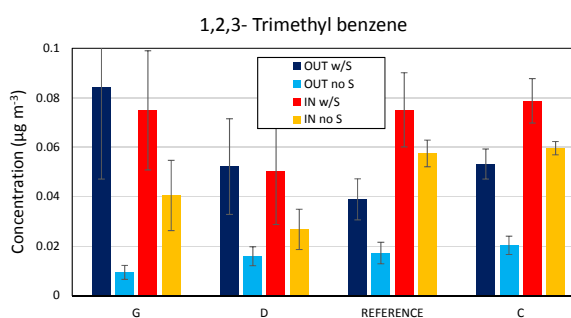
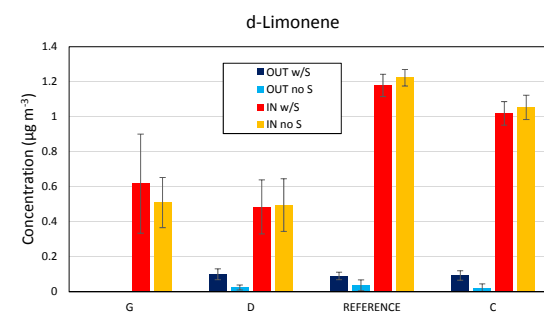
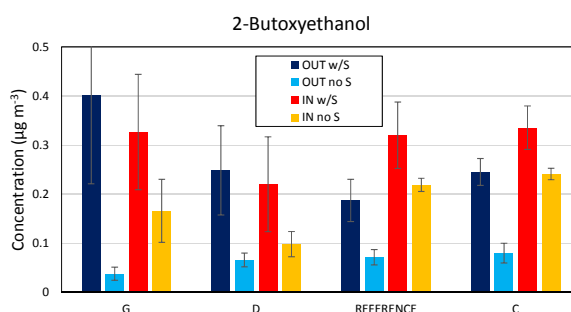
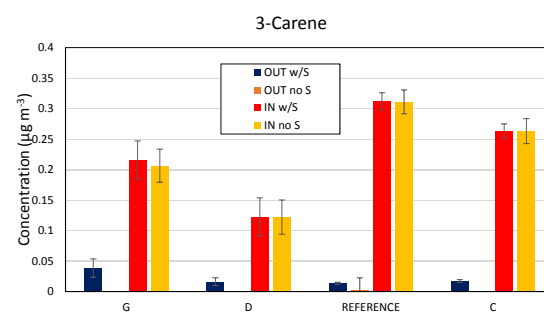
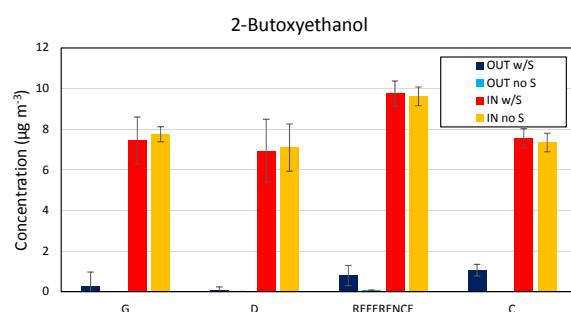
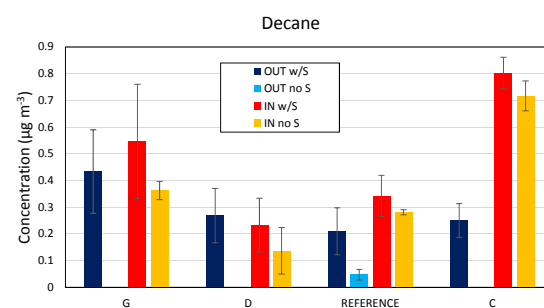
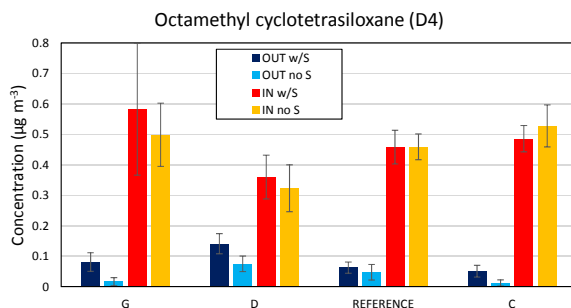
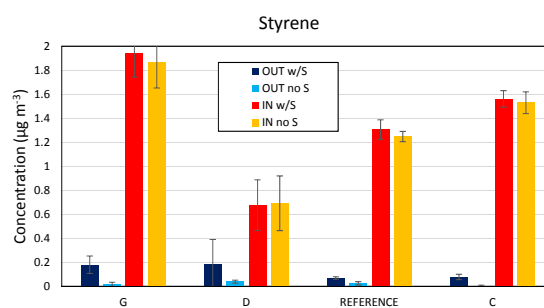
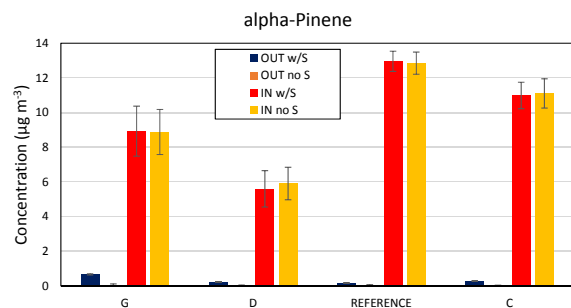
w / S: with scrubber; no S: without scrubber

Table SU-10-VOC-2. Experimental conditions for VOC measurements

System	ACH (h ⁻¹)		OUTDOOR						INDOOR					
			T (°C)		RH (%)		Dew Point (°C)		T (°C)		RH (%)		Dew Point (°C)	
	average	st dev	average	st dev	average	st dev	average	st dev	average	st dev	average	st dev	average	st dev
G	0.31	0.00	27	2	44	8	13	1	25	0	45	1	12	0
D	0.28	0.01	27	3	48	9	14	1	26	1	44	2	13	1
REF	0.29	0.00	24	0	60	1	15	0	26	0	44	0	13	0
C	0.25	0.00	28	1	39	2	11	1	26	0	44	0	13	0

Figure SU-10-VOC-1. Concentration of compounds measured in each system (OUT: outdoors; IN: indoors; w/S: with scrubber; no S: no scrubber)





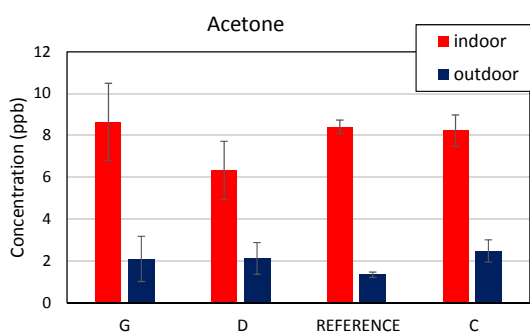
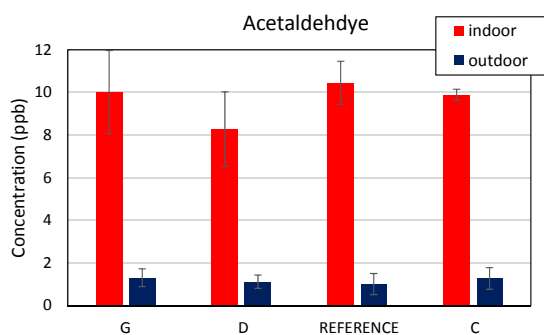
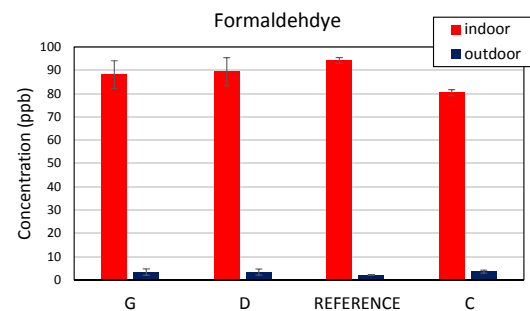
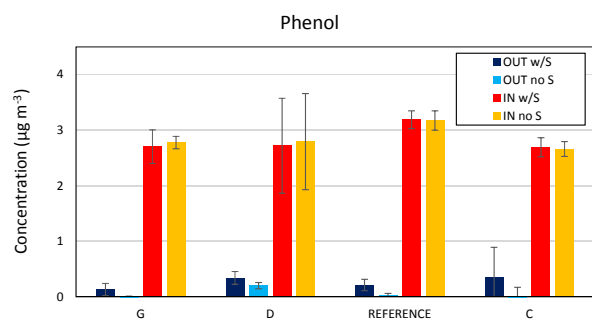
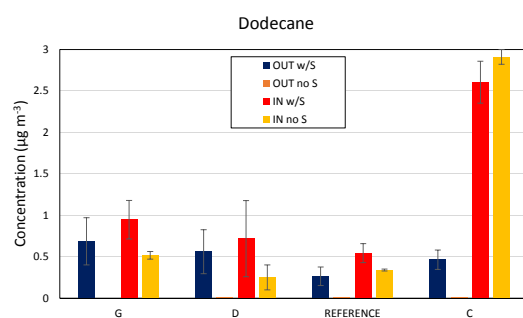
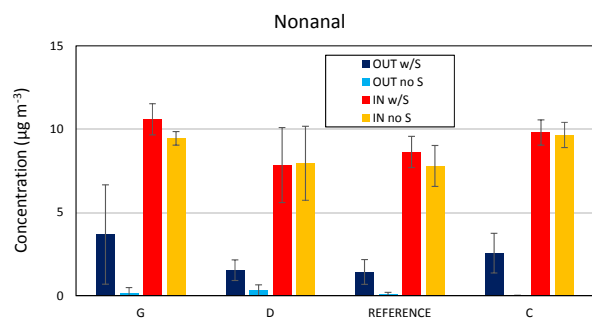
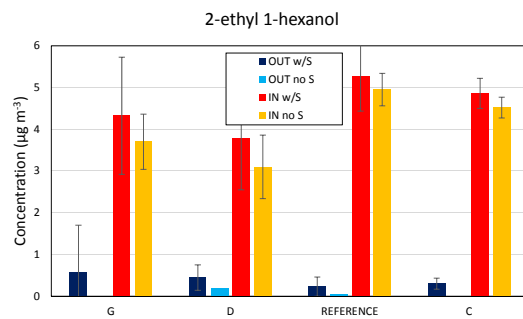
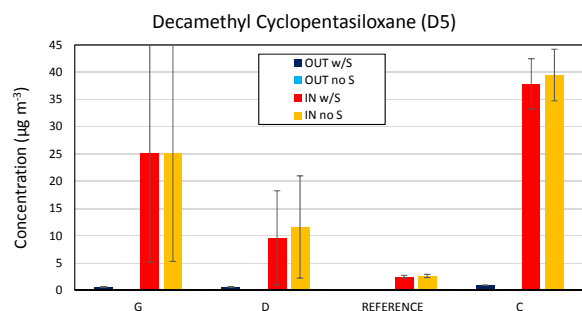
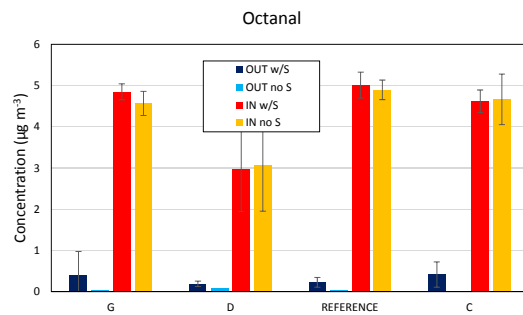
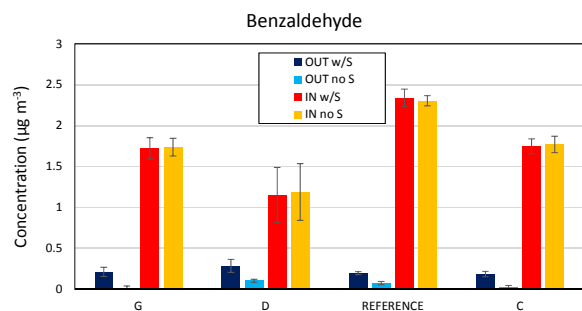
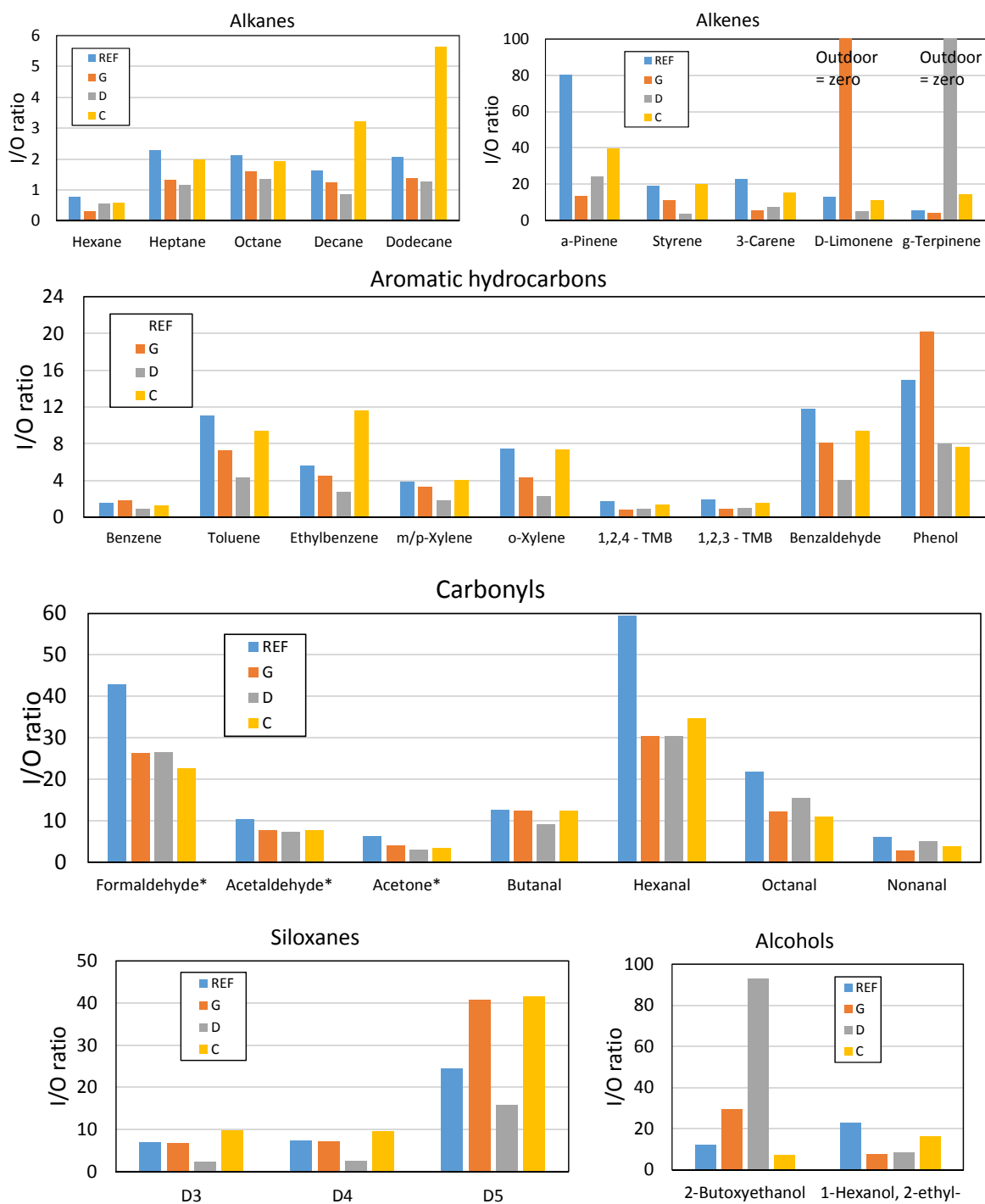
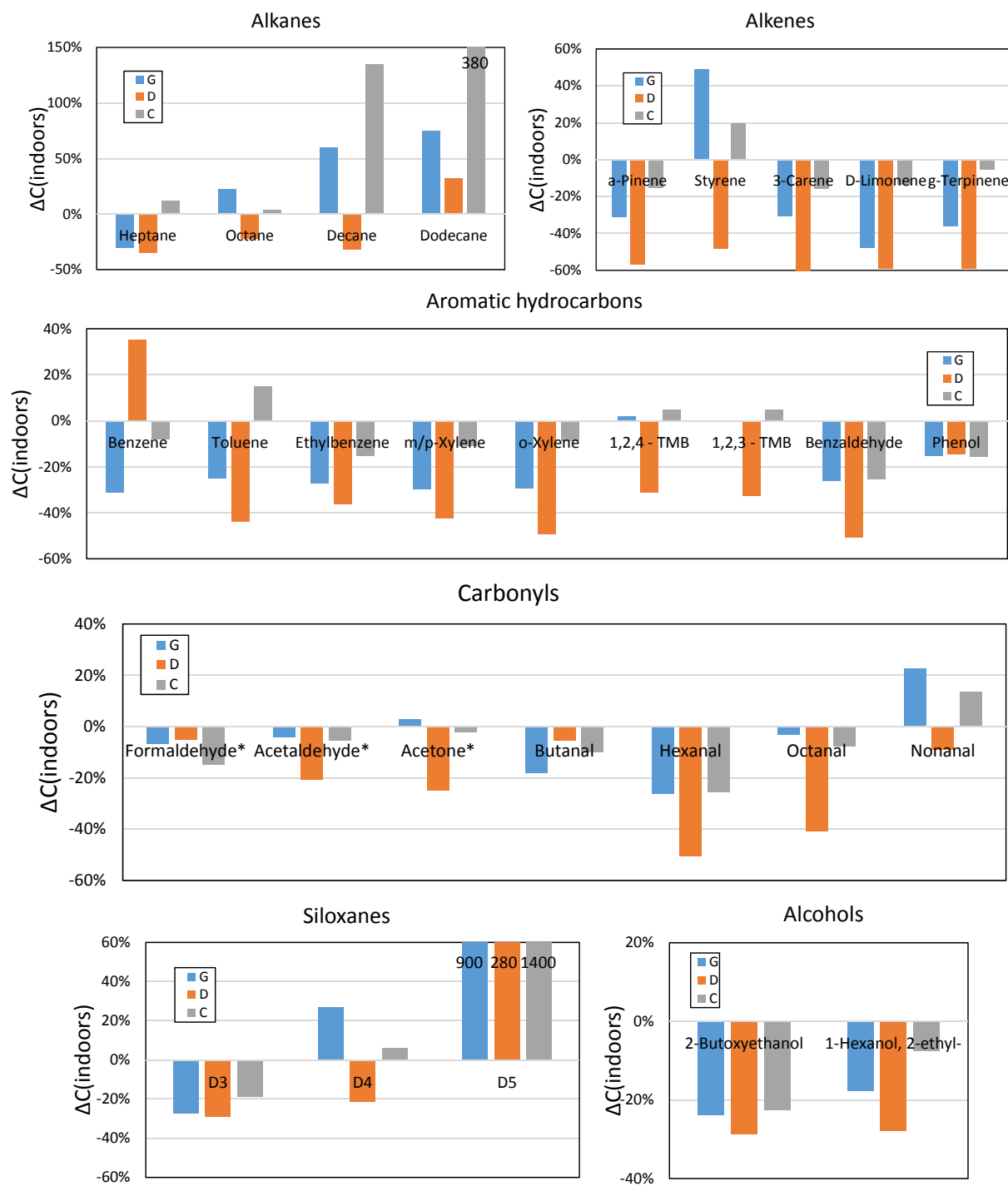


Figure SU-10-VOC-2. Indoor/Outdoor (I/O) ratios



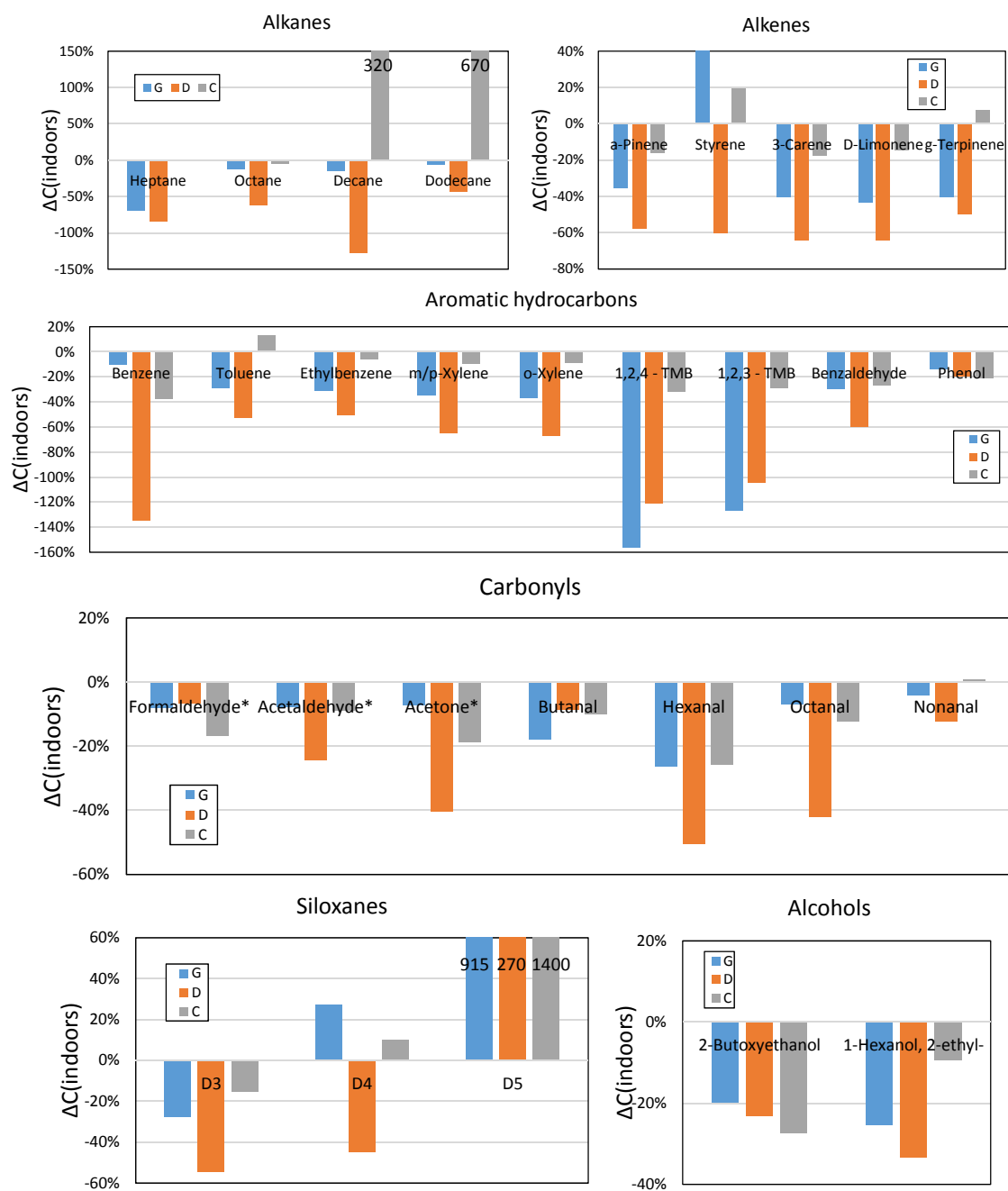
* determined by DNPH/HPLC method

Figure SU-10-VOC-3. Relative difference in indoor concentrations between each system and the reference system, % ΔC (indoors)



* determined by DNPH/HPLC method

Figure SU-10-VOC-4. Difference in differential concentrations, % ΔC (indoors-outdoors)



* determined by DNPH/HPLC method