**Supplemental Information**

Evaluation of total and inhalable samplers for the collection

of carbon nanotube and carbon nanofiber aerosols

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Table S1. Side-by-side sampler cross-configuration comparisons of gravimetric mass between grounded and ungrounded samplers at flow rates of 2 Lpm.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Material | Statistical Analysis | 25-mm OFC | 25-mm OFC Metal | Button Sampler‡ | Button Sampler‡ |
| Config. 1 | Config. 3 | Config. 1 | Config. 3 |
| Ungrounded | Grounded\* | Ungrounded | Grounded\* |
| ARD | Mean (mg/m3) | 5.79 | 9.78 | 8.29 | 10.23 |
| SD | 2.12 | 1.84 | 1.66 | 0.65 |
| Percent Error (95% CI) † | -34.7% (-56.2, -13.1) | | -18.9% (-26.9, -10.8) | |
| MW1 | Mean (mg/m3) | 2.87 | 6.67 | 5.21 | 6.82 |
| SD | 1.35 | 1.35 | 1.73 | 1.89 |
| Percent Error (95% CI) † | -55.6% (-66.7, -44.5) | | **-16.5% (-36.3, 3.4)** | |
| MW2 | Mean (mg/m3) | 0.95 | 0.92 | 0.81 | 0.58 |
| SD | 0.51 | 0.60 | 0.94 | 0.47 |
| Percent Error (95% CI) † | **34.1% (-12.1, 80.2)** | | 99.2% (17.7, 180.7) | |
| CNF1 | Mean (mg/m3) | 1.37 | 4.64 | 1.68 | 2.64 |
| SD | 0.82 | 1.62 | 0.45 | 0.65 |
| Percent Error (95% CI) † | -70.4% (-78.9, -61.8) | | -30.1% (-47.1, -13.1) | |

† Percent error was calculated as the average of error from the 15 paired samples and does not reflect the errors of the means.

‡ The Button Sampler flow rate was set at the prescribed 4 Lpm to sample the inhalable aerosol fraction.

\* Used as the reference sampler to calculate the averaged percent error.

Ungrounded and Grounded refer to the samplers being either electrically grounded or ungrounded to the VDT.

OFC= Open-Faced Cassette; ARD= Coarse Arizona Road Dust; MW1= Multi-Walled Carbon Nanotube 1; MW2= Multi-Walled Carbon Nanotube 2; CNF1= Carbon Nanofiber 1; SD= Standard Deviation; 95% CI= 95% Confidence Interval.

Bolded Percent Errors represent those found to contain the null (0) within their confidence interval.

Table S2. Side-by-side sampler cross-configuration comparisons of gravimetric mass between grounded and ungrounded samplers at flow rates of 5 Lpm.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Material | Statistical Analysis | 25-mm OFC | 25-mm OFC Metal | Button Sampler‡ | Button Sampler‡ |
| Config. 1 | Config. 3 | Config. 1 | Config. 3 |
| Ungrounded | Grounded\* | Ungrounded | Grounded\* |
| ARD | Mean (mg/m3) | 3.98 | 7.99 | 5.75 | 7.33 |
| SD | 1.19 | 0.91 | 1.90 | 1.24 |
| Percent Error (95% CI) † | -49.6% (-57.6, -41.5) | | **-15.9% (-41.1, 9.4)** | |
| MW1 | Mean (mg/m3) | 2.93 | 6.18 | 3.37 | 5.62 |
| SD | 1.23 | 1.69 | 0.74 | 1.49 |
| Percent Error (95% CI) † | -45.5% (-63.6, -27.3) | | -37.4% (-46.0, -28.9) | |
| MW2 | Mean (mg/m3) | 0.55 | 0.62 | 0.52 | 0.70 |
| SD | 0.35 | 0.25 | 0.32 | 0.42 |
| Percent Error (95% CI) † | **3.0% (-35.3, 41.3)** | | **5.9% (-41.1, 52.9)** | |
| CNF1 | Mean (mg/m3) | 1.50 | 3.67 | 1.42 | 2.00 |
| SD | 0.60 | 0.77 | 0.46 | 0.46 |
| Percent Error (95% CI) † | -56.6% (-67.3, -45.9) | | -27.2% (-40.5, -13.8) | |

† Percent error was calculated as the average of error from the 15 paired samples and does not reflect the errors of the means.

‡ The Button Sampler flow rate was set at the prescribed 4 Lpm to sample the inhalable aerosol fraction.

\* Used as the reference sampler to calculate the averaged percent error.

Ungrounded and Grounded refer to the samplers being either electrically grounded or ungrounded to the VDT.

OFC= Open-Faced Cassette; ARD= Coarse Arizona Road Dust; MW1= Multi-Walled Carbon Nanotube 1; MW2= Multi-Walled Carbon Nanotube 2; CNF1= Carbon Nanofiber 1; SD= Standard Deviation; 95% CI= 95% Confidence Interval.

Bolded Percent Errors represent those found to contain the null (0) within their confidence interval.

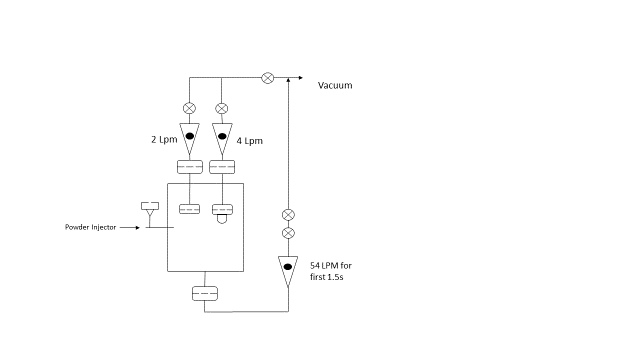


Figure S1. The Venturi Dustiness Tester used in this study and a schematic design of configuration 1 at the flow rate of 2 Lpm. Conversely, using configuration 1 at 5 Lpm would mean that the 25-mm OFC would be operating at 5 Lpm, the Button Sampler would remain at 4 Lpm, and the flow rate through the extraction port would be 51 Lpm for a total injection flow rate of 60 Lpm.

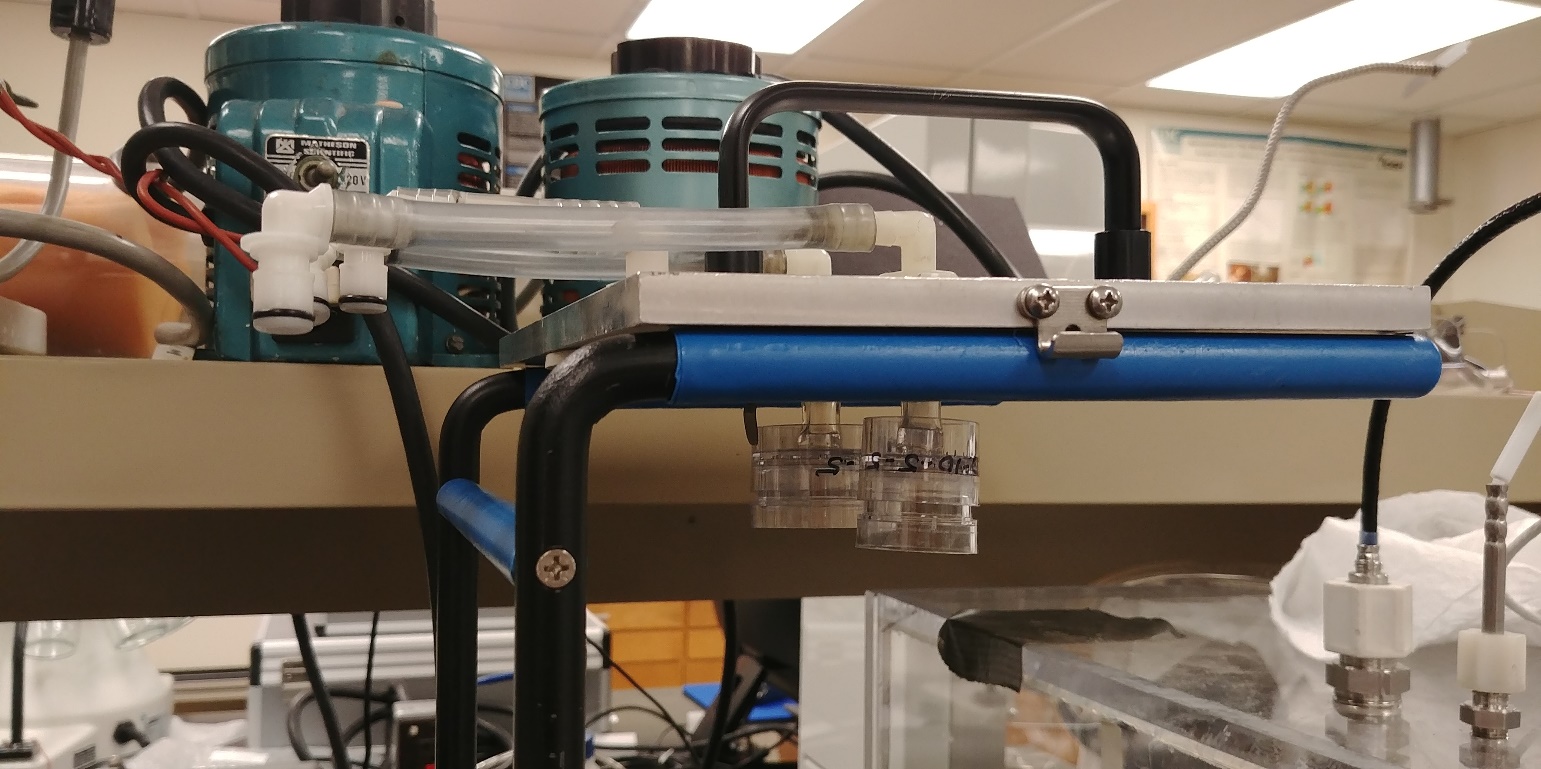


Figure S2. The sampler configuration arrangement for configuration two (25-mm styrene OFC vs. 37-mm styrene OFC) prior to being loaded into the VDT chamber. Note: all other sampler configurations would be situated in a similar manner with sampling orifices facing downward.