May 15, 2017

University of Toronto
255 McCaul Street, Level 4
Toronto, Ontario M5T 1W7

Attn: Mr. Irfan Miraj, P.Eng., MHSc.
Manager, Hazardous Construction Materials Group

Re: Results of PCM and TEM Air Monitoring Program
May 8- 12, 2017
University of Toronto – Medical Sciences Building
1 King's College Circle, Toronto, Ontario

1.0 INTRODUCTION

Safetech Environmental Limited (SEL) has been retained from May 8 to May 12, 2017 to provide air monitoring services for the University of Toronto's Medical Sciences Building located at 1 King's College Circle, Toronto, Ontario M5S 1A8. Air sampling has been performed at the request of Mr. Irfan Miraj, Manager, Hazardous Construction Materials Group, to determine if airborne asbestos fibre concentrations are within acceptable and applicable limits. This report provides detail of air sampling conducted from May 8-12, 2017.

From May 8 to May 12, SEL has collected a total of 59 representative samples, 8 location specific samples and 10 outdoor samples:

- Representative samples refer to locations that were uniformly selected and also upon occupant request. These "building-wide" air samples provide an overview of air quality with regard to airborne fibres.
- Location samples refer to samples taken pre- and post-asbestos clean-up in locations where asbestos-containing dust (>0.5%) were present.
- Outdoor reference samples were collected because asbestos fibres are naturally occurring.

2.0 SUMMARY OF CONCLUSIONS

The Medical Sciences Building air quality is not being negatively impacted by the presence of asbestos-containing building materials existing within the building. The building is deemed to be safe for general occupancy. In addition, although construction related work is being conducted at various locations within the Medical Sciences Building it does not appear that airborne fibres are being drawn into the heating, ventilation and air conditioning systems and negatively impacting the quality of air.

SEL has based above conclusions on the facts briefly described below:

- Of the 59 representative samples; all 59 samples indicate that at the time of sampling the airborne fiber concentrations were well below the TWA (time weighted average) of 0.1 fibers per cubic centimeter (f/cc), in accordance with Ontario Regulation 490/09, Designated Substances and also below 50% TWA; an action level followed by SEL.

- Of the 8 location specific samples; all 8 samples indicate that at the time of sampling the airborne fiber concentrations were well below the TWA (time weighted average) of 0.1 fibers per cubic centimeter (f/cc), in accordance with Ontario Regulation 490/09, Designated Substances and also below 50% TWA; an action level followed by SEL.

- All 10 outdoor samples also indicated that at the time of sampling the airborne fiber concentrations were well below 0.1f/cc.

Please refer to Appendix A detailed spread sheets and technical reports of aforementioned samples. As explained in next section (3.1), other non-asbestos fibres and particles may interfere and result in higher fibre counts. Therefore the results shown in Appendix A do not reflect airborne concentrations of asbestos alone but for the purpose of this assessment, it is compared to the TWA for asbestos. Actual airborne asbestos fibre concentration may be lower than the values in Appendix A.

3.0 METHODOLOGY

3.1 Air Monitoring for Airborne Fibres

Phase contrast microscopy (PCM) air samples were retrieved within designated locations. The air samples were collected using a 25-mm three-piece filter cassettes containing a 0.8 µm cellulose ester membrane filter and equipped with a 50-mm electrically conductive extension cowl. The filter cassettes were attached to a high volume air sampling pump calibrated with a filter cassette in line to a known flow rate.

The air sampling pumps were calibrated to a flow rate of approximately 15 litres per minute. The air samples were collected using 25 mm three piece cassette with 50 mm electrically conductive extension cowl and mixed cellulose ester filter, 0.8 µm (recommended 0.45 to 1.2 in method) effective pore size, and back-up pad. The air samples were analyzed in accordance with U.S. National Institute of Occupational Safety and Health (NIOSH) Manual of Analytical Methods, Method 7400, Issue 2: Asbestos and other Fibres by PCM (August 15, 1994), using the asbestos fibre counting rules.

The quantitative working range of this method is 0.04 to 0.5 fibre/cc for a 1000 L air sample. The Limit of Detection (LOD) depends on sample volume and quantity of interfering dust, and is < 0.01 fibre/cc for atmospheres free of interferences. The method gives an index of airborne fibres. Fibres less than approximately 0.25 µm in diameter will not be detected by this method. In addition, other airborne fibres and particles that fall within the counting range criteria may act as possible interferences. Demolition and construction related work areas where high levels of dust are present might overload the membrane and/or interfere with the analysis. As required by NIOSH Method 7400, blank filters were submitted for analysis to ensure that no contamination of the filters occurred during sampling or analytical procedures. Analytical results, as reported in the result table of this report have been field blank corrected.

3.2 Transmission Electron Microscopy

Where PCM results indicate airborne fibres to be greater than 50% of the TWA, a secondary analysis of air samples was conducted using NIOSH Method 7402, Issue 2: Asbestos by TEM (August 15, 1994). This method is used to determine asbestos fibres in the optically visible range and has the ability to distinguish asbestos fibres from other types of fibres (e.g. clothing fibres). It is intended to complement the results obtained by phase contrast microscopy (NIOSH Method 7400).

In accordance with this method, a sample is analyzed at a magnification of 10,000 times. Only fibres with an aspect ratio of >3:1 and only those fibres greater than 5 µm in length are counted. The quantitative working range of this method is 0.04 to 0.5 fibres per cubic centimetre (f/cc) for a 1000 litre (L) air sample. The Limit of Detection (LOD) depends on sample volume and quantity of interfering dust, and is < 0.01 fibres per cubic centimetre (f/cc) for atmospheres free of interferences. Other amphibole particles that have asbestos ratios greater than 3:1 and elemental compositions similar to the asbestos minerals may interfere in the TEM analysis. Some non-amphibole minerals may give electron diffraction patterns similar to amphiboles. High concentrations of background dust may also interfere with fibre identification.

4.0 LIMITATIONS

The investigation, assessments and recommendations detailed in this report were carried out in a manner consistent with the level of care and skill normally exercised by reasonable members of the environmental and industrial hygiene consulting profession currently practicing under similar conditions in the area. Furthermore, the investigation, assessments and recommendations in this report have been made based on conditions observed at the time of the assessment and are limited to the areas investigated.

In preparing this report, Safetech Environmental Limited (SEL) relied on information supplied by others. Except as expressly set-out in this report, SEL has not made any independent verification of such information.

The analytical method used meets the requirements of O.Reg. 278/05. However, it is important to note that this method is not specific to the identification of asbestos fibres. All particles with a length greater than 5 micrometres, less than 3 micrometres in diameter and a length to diameter ratio of 3 to 1 or greater are included in the count. Fibres with diameters less than about 0.3 micrometres cannot be detected using this method regardless of length.

This report has been prepared for the sole use of the person or entity to who it is addressed. No other person or entity is entitled to use or rely upon this report without the express written consent of Safetech Environmental Limited and the person or entity to who it is addressed. Any use that a third party makes of this report, or any reliance based on conclusions and recommendations made, are the responsibility of such third parties. SEL accepts no responsibility for damages suffered by third parties as a result of actions based on this report.

Should you have any questions regarding this project, please contact our office.
Sincerely,

SAFETECH ENVIRONMENTAL LIMITED

Josh Hamilton
OH&S Technician

D. Glenn Smith, BA, CRSP, AMRT
Senior Project Manager

Appendices:

Appendix A – PCM Air Sample Spreadsheets – SEL
Appendix B – PCM Location Specific Report
Appendix C – Pump Calibration Sheets
Appendix D – PCM Analysis Example Calculation Sheet

Appendix A
PCM AIR SAMPLE SPREADSHEET-SEL

Phase Contrast Microscopy Air Sampling Program, Medical Sciences Building, Floor 6, University of Toronto, May 12, 2017

Floor	Room	Description	Sample Location	Sample Number	Pump Number	Litres Per Minute	Time On	Time Off	Duration	Total Litres	Total Fibres	Results f/cc	Analyst	Within Acceptable Limits	Comments
6	6334A	Office	Central	2017-05-967	1	15.02	9:16	13:03	227	3410	5.5	0.001	JC	Yes	Not Occupied
6	6334B	Office	Central	2017-05-968	6	15.02	9:16	13:06	230	3455	4.5	0.001	JC	Yes	Not Occupied
6	6334	Lab	Central	2017-05-969	2	14.99	9:20	13:08	228	3418	8	0.001	JC	Yes	Not Occupied
6	6334A	Office	Central	2017-05-972	1	15.02	13:04	15:53	169	2538	4	0.001	JC	Yes	Not Occupied
6	6334B	Office	Central	2017-05-973	6	15.02	13:08	15:55	167	2508	5	0.001	JC	Yes	Not Occupied
6	6334	Lab	Northwest	2017-05-974	2	14.99	13:10	15:58	168	2518	11.5	0.002	JC	Yes	Occupied.
	Exterior Control	NA	South of Medical Sciences Building	2017-05-975	10	14.98	14:54	16:06	72	1079	3	0.001	JC	Yes	Exterior sample for comparison.
	Exterior Control	NA	North of Medical Sciences Building	2017-05-976	8	14.96	14:59	16:09	70	1047	3	0.001	JC	Yes	Exterior sample for comparison.
	Field blank	NA	NA	2017-05-977	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
	Field Blank	NA	NA	2017-05-978	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
	Field Blank	NA	NA	2017-05-979	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
	Field Blank	NA	NA	2017-05-980	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.

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Interpretation of Results

1) Within Ontario, the Occupational Health and Safety Act - Ontario Regulation 490/09 Designated Substances adopts the ACGIH TWA of 0.1 fibres/cc.

2) For each area tested compare the "Results f/cc" column to your area and how it compares to the above noted regulation.

Phase Contrast Microscopy Air Sampling Program, Medical Sciences Building, Floor 4, University of Toronto, May 12, 2017

Floor	Room	Description	Sample Location	Sample Number	Pump Number	Litres Per Minute	Time On	Time Off	Duration	Total Litres	Total Fibres	Results f/cc	Analyst	Within Acceptable Limits	Comments
4	4369K	Hallway	Adjacent to 4364	2017-05-970	5	15.07	10:22	11:30	68	1025	10.5	0.005	JC	Yes	During Gasket Installation.
4	4350K	Hallway	Adjacent to 4351	2017-05-971	5	15.07	12:52	14:08	76	1145	16.5	0.007	JC	Yes	During Gasket Installation.
	Exterior Control	NA	South of Medical Sciences Building	2017-05-975	10	14.98	14:54	16:06	72	1079	3	0.001	JC	Yes	Exterior sample for comparison.
	Exterior Control	NA	North of Medical Sciences Building	2017-05-976	8	14.96	14:59	16:09	70	1047	3	0.001	JC	Yes	Exterior sample for comparison.
	Field blank	NA	NA	2017-05-977	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
	Field Blank	NA	NA	2017-05-978	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
	Field Blank	NA	NA	2017-05-979	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
	Field Blank	NA	NA	2017-05-980	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.

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Phase Contrast Microscopy Air Sampling Program, Medical Sciences Building, Floor 7, University of Toronto, May 11, 2017

Floor	Room	Description	Sample Location	Sample Number	Pump Number	Litres Per Minute	Time On	Time Off	Duration	Total Litres	Total Fibres	Results f/cc	Analyst	Within Acceptable Limits	Comments
7	7347K	Hallway	Adjacent to 7340	2017-05-954	5	14.99	10:32	12:05	93	1394	12	0.004	JC	Yes	7340 Gasket Installation.
	Exterior Control	NA	South of Medical Sciences Building	2017-05-961	1	15.06	14:12	15:20	68	1024	3	0.001	JC	Yes	Exterior sample for comparison.
	Exterior Control	NA	North of Medical Sciences Building	2017-05-962	6	15.02	14:19	15:27	68	1021	2	0.001	JC	Yes	Exterior sample for comparison.
	Field blank	NA	NA	2017-05-963	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
	Field Blank	NA	NA	2017-05-964	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
	Field Blank	NA	NA	2017-05-965	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
	Field Blank	NA	NA	2017-05-966	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.

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2) For each area tested compare the "Results f/cc" column to your area and how it compares to the above noted regulation.

Phase Contrast Microscopy Air Sampling Program, Medical Sciences Building, Floor 6, University of Toronto, May 11, 2017

Floor	Room	Description	Sample Location	Sample Number	Pump Number	Litres Per Minute	Time On	Time Off	Duration	Total Litres	Total Fibres	Results f/cc	Analyst	Within Acceptable Limits	Comments
6	6334A	Office	Central	2017-05-958	8	15.04	13:20	14:58	98	1474	2.5	0.001	JC	Yes	Not Occupied.
6	6334B	Office	Central	2017-05-959	10	15.1	13:23	15:00	97	1465	4	0.001	JC	Yes	Not Occupied.
6	6334	Lab	Central	2017-05-960	2	15.03	13:25	15:03	98	1473	3	0.001	JC	Yes	Not Occupied.
	Exterior Control	NA	South of Medical Sciences Building	2017-05-961	1	15.06	14:12	15:20	68	1024	3	0.001	JC	Yes	Exterior sample for comparison.
	Exterior Control	NA	North of Medical Sciences Building	2017-05-962	6	15.02	14:19	15:27	68	1021	2	0.001	JC	Yes	Exterior sample for comparison.
	Field blank	NA	NA	2017-05-963	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
	Field Blank	NA	NA	2017-05-964	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
	Field Blank	NA	NA	2017-05-965	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
	Field Blank	NA	NA	2017-05-966	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.

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2) For each area tested compare the "Results f/cc" column to your area and how it compares to the above noted regulation.

Phase Contrast Microscopy Air Sampling Program, Medical Sciences Building, Floor 5, University of Toronto, May 11, 2017

Floor	Room	Description	Sample Location	Sample Number	Pump Number	Litres Per Minute	Time On	Time Off	Duration	Total Litres	Total Fibres	Results f/cc	Analyst	Within Acceptable Limits	Comments
5	5322K	Hallway	Adjacent to 5312	2017-05-957	5	14.99	12:49	14:28	99	1484	12	0.004	JC	Yes	5312 Gasket Installation.
	Exterior Control	NA	South of Medical Sciences Building	2017-05-961	1	15.06	14:12	15:20	68	1024	3	0.001	JC	Yes	Exterior sample for comparison.
	Exterior Control	NA	North of Medical Sciences Building	2017-05-962	6	15.02	14:19	15:27	68	1021	2	0.001	JC	Yes	Exterior sample for comparison.
	Field blank	NA	NA	2017-05-963	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
	Field Blank	NA	NA	2017-05-964	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
	Field Blank	NA	NA	2017-05-965	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
	Field Blank	NA	NA	2017-05-966	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.

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2) For each area tested compare the "Results f/cc" column to your area and how it compares to the above noted regulation.

Phase Contrast Microscopy Air Sampling Program, Medical Sciences Building, Floor 3, University of Toronto, May 11, 2017

Floor	Room	Description	Sample Location	Sample Number	Pump Number	Litres Per Minute	Time On	Time Off	Duration	Total Litres	Total Fibres	Results f/cc	Analyst	Within Acceptable Limits	Comments
3	3320K	Hallway	Adjacent to 3312	2017-05-946	5	14.99	9:02	10:26	84	1259	11.5	0.004	JC	Yes	3312 Gasket Installation.
	Exterior Control	NA	South of Medical Sciences Building	2017-05-961	1	15.06	14:12	15:20	68	1024	3	0.001	JC	Yes	Exterior sample for comparison.
	Exterior Control	NA	North of Medical Sciences Building	2017-05-962	6	15.02	14:19	15:27	68	1021	2	0.001	JC	Yes	Exterior sample for comparison.
	Field blank	NA	NA	2017-05-963	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
	Field Blank	NA	NA	2017-05-964	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
	Field Blank	NA	NA	2017-05-965	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
	Field Blank	NA	NA	2017-05-966	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.

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2) For each area tested compare the "Results f/cc" column to your area and how it compares to the above noted regulation.

Phase Contrast Microscopy Air Sampling Program, Medical Sciences Building, Floor 1, University of Toronto, May 11, 2017

Floor	Room	Description	Sample Location	Sample Number	Pump Number	Litres Per Minute	Time On	Time Off	Duration	Total Litres	Total Fibres	Results f/cc	Analyst	Within Acceptable Limits	Comments
1	1105K	Hallway	Central	2017-05-947	2	15.03	9:35	11:55	140	2104	16	0.004	JC	Yes	Occupied.
1	1114	Lab	Central	2017-05-948	10	15.1	9:40	11:59	139	2099	6	0.001	JC	Yes	Occupied.
1	1137K	Hallway	Central	2017-05-949	8	15.04	9:44	12:02	138	2076	11	0.003	JC	Yes	Occupied.
1	1137	Lab	Central	2017-05-950	1	15.06	9:53	12:06	133	2003	7	0.002	JC	Yes	Not Occupied.
1	1145K	Hallway	Central	2017-05-951	6	15.02	9:56	12:08	132	1983	8	0.002	JC	Yes	Occupied.
1	1153K	Hallway	Central	2017-05-952	7	14.93	10:00	12:18	138	2060	13	0.003	JC	Yes	Occupied.
1	1156K	Hallway	Central	2017-05-953	9	14.96	10:04	12:14	130	1944	8	0.002	JC	Yes	Occupied.
1	1168K	Hallway	Central	2017-05-955	7	14.93	12:22	14:47	145	2165	6	0.001	JC	Yes	Occupied.
1	1232	Elevator Lobby	Central	2017-05-956	9	14.96	12:33	14:50	137	2050	21	0.005	JC	Yes	Occupied.
	Exterior Control	NA	South of Medical Sciences Building	2017-05-961	1	15.06	14:12	15:20	68	1024	3	0.001	JC	Yes	Exterior sample for comparison.
	Exterior Control	NA	North of Medical Sciences Building	2017-05-962	6	15.02	14:19	15:27	68	1021	2	0.001	JC	Yes	Exterior sample for comparison.
	Field blank	NA	NA	2017-05-963	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
	Field Blank	NA	NA	2017-05-964	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
	Field Blank	NA	NA	2017-05-965	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
	Field Blank	NA	NA	2017-05-966	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.

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Phase Contrast Microscopy Air Sampling Program, Medical Sciences Building, Floor 3, University of Toronto, May 10, 2017

Floor	Room	Description	Sample Location	Sample Number	Pump Number	Litres Per Minute	Time On	Time Off	Duration	Total Litres	Total Fibres	Results f/cc	Analyst	Within Acceptable Limits	Comments
3	3324K	Hallway	Adjacent to 3323A	2017-05-925	5	14.96	10:38	11:54	76	1137	12.5	0.005	JC	Yes	3323A Gasket Installation
3	3324K	Hallway	Adjacent to 3323	2017-05-933	5	14.96	12:50	14:20	90	1346	11	0.004	JC	Yes	3323 Gasket Installation
3	3348K	Hallway	Adjacent to 3340	2017-05-934	2	15.02	13:40	15:07	87	1307	9.5	0.004	JC	Yes	3340 Gasket Installation
	Exterior Control	NA	North of Medical Sciences Building	2017-05-940	6	15.04	14:33	15:42	69	1038	3	0.001	JC	Yes	Exterior sample for comparison.
	Exterior Control	NA	South of Medical Sciences Building	2017-05-941	1	14.95	14:39	15:51	72	1076	3	0.001	JC	Yes	Exterior sample for comparison.
	Field blank	NA	NA	2017-05-942	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
	Field Blank	NA	NA	2017-05-943	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
	Field Blank	NA	NA	2017-05-944	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
	Field Blank	NA	NA	2017-05-945	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.

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Phase Contrast Microscopy Air Sampling Program, Medical Sciences Building, Floor 2, University of Toronto, May 10, 2017

Floor	Room	Description	Sample Location	Sample Number	Pump Number	Litres Per Minute	Time On	Time Off	Duration	Total Litres	Total Fibres	Results f/cc	Analyst	Within Acceptable Limits	Comments
2	2175K	Hallway	Central	2017-05-926	6	15.04	11:05	13:05	120	1805	6.5	0.002	JC	Yes	Occupied.
2	2279	Lab	Central	2017-05-927	1	14.95	11:14	13:09	115	1719	7.5	0.002	JC	Yes	Not Occupied
2	2282	Lab	Central	2017-05-928	2	15.02	11:18	13:13	115	1727	7	0.002	JC	Yes	Not Occupied
2	2384K	Hallway	Central	2017-05-929	9	15.04	11:22	13:18	116	1745	9	0.002	JC	Yes	Occupied.
2	2375K	Hallway	Central	2017-05-930	7	14.99	11:26	13:22	116	1739	10.5	0.003	JC	Yes	Occupied.
2	2138K	Hallway	Central	2017-05-931	10	14.97	11:30	13:50	80	1198	8	0.003	JC	Yes	Occupied.
2	2171	Commons	Central	2017-05-932	8	15.1	11:36	13:54	78	1178	10.5	0.004	JC	Yes	Occupied.
2	2130V	Hallway	Central	2017-05-935	10	14.97	14:03	15:15	72	1078	15	0.007	JC	Yes	Occupied.
2	2128V	Hallway	Central	2017-05-936	8	15.1	14:07	15:17	70	1057	11.5	0.005	JC	Yes	Occupied.
2	2322K	Hallway	Central	2017-05-937	9	15.04	14:12	15:22	70	1053	11	0.005	JC	Yes	Occupied.
2	2322	Common Area	Central	2017-05-938	7	14.99	14:16	15:25	69	1034	14	0.006	JC	Yes	Occupied.
2	250	Outside Red Room	Central	2017-05-939	5	14.96	14:25	15:35	70	1047	9	0.004	JC	Yes	Occupied.
	Exterior Control	NA	North of Medical Sciences Building	2017-05-940	6	15.04	14:33	15:42	69	1038	3	0.001	JC	Yes	Exterior sample for comparison.

Phase Contrast Microscopy Air Sampling Program, Medical Sciences Building, Floor 2, University of Toronto, May 10, 2017

Floor	Room	Description	Sample Location	Sample Number	Pump Number	Litres Per Minute	Time On	Time Off	Duration	Total Litres	Total Fibres	Results f/cc	Analyst	Within Acceptable Limits	Comments
	Exterior Control	NA	South of Medical Sciences Building	2017-05-941	1	14.95	14:39	15:51	72	1076	3	0.001	JC	Yes	Exterior sample for comparison.
	Field blank	NA	NA	2017-05-942	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
	Field Blank	NA	NA	2017-05-943	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
	Field Blank	NA	NA	2017-05-944	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
	Field Blank	NA	NA	2017-05-945	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.

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Interpretation of Results

1) Within Ontario, the Occupational Health and Safety Act - Ontario Regulation 490/09 Designated Substances adopts the ACGIH TWA of 0.1 fibres/cc.

2) For each area tested compare the "Results f/cc" column to your area and how it compares to the above noted regulation.

Phase Contrast Microscopy Air Sampling Program, Medical Sciences Building, Floor 5, University of Toronto, May 9, 2017

Floor	Room	Description	Sample Location	Sample Number	Pump Number	Litres Per Minute	Time On	Time Off	Duration	Total Litres	Total Fibres	Results f/cc	Analyst	Within Acceptable Limits	Comments
5	5303	Lab	Central	2017-05-918	7	14.96	9:06	10:28	82	1227	6	0.002	SC/GS	Yes	Not Occupied.
	Exterior Control	NA	South of Medical Sciences Building	2017-05-919	2	15.01	13:41	15:30	109	1668	3	0.001	SC/GS	Yes	Exterior sample for comparison.
	Exterior Control	NA	North of Medical Sciences Building	2017-05-920	5	14.99	13:47	15:34	117	1754	2	0.001	SC/GS	Yes	Exterior sample for comparison.
6	Field blank	NA	NA	2017-05-921	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-05-922	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-05-923	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-05-924	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.

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Interpretation of Results

1) Within Ontario, the Occupational Health and Safety Act - Ontario Regulation 490/09 Designated Substances adopts the ACGIH TWA of 0.1 fibres/cc.

2) For each area tested compare the "Results f/cc" column to your area and how it compares to the above noted regulation.

Phase Contrast Microscopy Air Sampling Program, Medical Sciences Building, Floor 4, University of Toronto, May 9, 2017

Floor	Room	Description	Sample Location	Sample Number	Pump Number	Litres Per Minute	Time On	Time Off	Duration	Total Litres	Total Fibres	Results f/cc	Analyst	Within Acceptable Limits	Comments
4	4368	Lab	Central	2017-05-904	1	14.96	9:06	10:28	82	1227	6	0.002	SC/GS	Yes	Not Occupied.
	Exterior Control	NA	South of Medical Sciences Building	2017-05-919	2	15.01	13:41	15:30	109	1668	3	0.001	SC/GS	Yes	Exterior sample for comparison.
	Exterior Control	NA	North of Medical Sciences Building	2017-05-920	5	14.99	13:47	15:34	117	1754	2	0.001	SC/GS	Yes	Exterior sample for comparison.
6	Field blank	NA	NA	2017-05-921	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-05-922	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-05-923	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-05-924	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.

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Interpretation of Results

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2) For each area tested compare the "Results f/cc" column to your area and how it compares to the above noted regulation.

Phase Contrast Microscopy Air Sampling Program, Medical Sciences Building, Floor 3, University of Toronto, May 9, 2017

Floor	Room	Description	Sample Location	Sample Number	Pump Number	Litres Per Minute	Time On	Time Off	Duration	Total Litres	Total Fibres	Results f/cc	Analyst	Within Acceptable Limits	Comments
3	3320K	Hallway	Central	2017-05-905	9	14.96	9:26	10:42	76	1137	6	0.002	SC/GS	Yes	Occupied.
3	3222K	Hallway	Central	2017-05-906	10	15.02	9:30	10:49	79	1187	2	0.001	SC/GS	Yes	Occupied.
3	3279	Janitorial Room	Central	2017-05-907	2	15.01	9:39	11:03	84	1261	5	0.002	SC/GS	Yes	Not Occupied
3	3348K	Hallway	Central	2017-05-908	6	14.97	9:46	11:13	87	1302	3	0.001	SC/GS	Yes	Occupied.
3	3324K	Hallway	Central	2017-05-909	7	15.07	9:50	11:15	85	1281	5	0.002	SC/GS	Yes	Occupied.
3	3369K	Hallway	Central	2017-05-910	8	15.02	9:56	11:27	91	1367	5.5	0.002	SC/GS	Yes	Occupied.
3	3383K	Hallway	Central	2017-05-911	5	14.99	10:06	11:31	85	1274	5	0.002	SC/GS	Yes	Occupied.
3	3363	Lab	Central	2017-05-912	1	14.96	11:07	12:18	71	1062	6	0.002	SC/GS	Yes	Not Occupied
3	3345	Lab	Central	2017-05-913	6	14.97	11:23	13:52	89	1332	3	0.001	SC/GS	Yes	Not Occupied
3	3380	Glasswashing Room	Central	2017-05-914	7	15.07	11:54	14:07	133	2004	4	0.001	SC/GS	Yes	Occupied.
3	3388K	Hallway	Central	2017-05-915	8	15.02	12:00	14:32	152	2283	9.5	0.002	SC/GS	Yes	Occupied.
3	3249K	Hallway	Central	2017-05-916	10	15.02	12:05	14:35	150	2253	8	0.002	SC/GS	Yes	Occupied.
3	3278K	Hallway	Central	2017-05-917	9	14.96	12:10	14:38	148	2214	9	0.002	SC/GS	Yes	Occupied.
	Exterior Control	NA	South of Medical Sciences Building	2017-05-919	2	15.01	13:41	15:30	109	1668	3	0.001	SC/GS	Yes	Exterior sample for comparison.
	Exterior Control	NA	North of Medical Sciences Building	2017-05-920	5	14.99	13:47	15:34	117	1754	2	0.001	SC/GS	Yes	Exterior sample for comparison.
6	Field blank	NA	NA	2017-05-921	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-05-922	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-05-923	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-05-924	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.

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Interpretation of Results

1) Within Ontario, the Occupational Health and Safety Act - Ontario Regulation 490/09 Designated Substances adopts the ACGIH TWA of 0.1 fibres/cc.

2) For each area tested compare the "Results f/cc" column to your area and how it compares to the above noted regulation.

Phase Contrast Microscopy Air Sampling Program, Medical Sciences Building, Floor 5, University of Toronto, May 8, 2017

Floor	Room	Description	Sample Location	Sample Number	Pump Number	Litres Per Minute	Time On	Time Off	Duration	Total Litres	Total Fibres	Results f/cc	Analyst	Within Acceptable Limits	Comments
5	5344	Lab	Adjacent to Shaft	2017-05-889	1	14.97	12:50	14:25	95	1422	13	0.004	SC/GS	Yes	Following Gasket Installation
5	5342	Lab	Adjacent to Shaft	2017-05-890	2	15.03	13:03	14:31	98	1473	3	0.001	SC/GS	Yes	During Gasket installation
5	5366	Lab	Adjacent to Shaft	2017-05-899	1	14.97	14:47	16:22	95	1422	4.5	0.001	SC/GS	Yes	Following Gasket Installation
	Exterior Control	NA	South of Medical Sciences Building	2017-05-897	2	15.03	14:37	16:28	111	1668	2.5	0.001	SC/GS	Yes	Exterior sample for comparison.
	Exterior Control	NA	North of Medical Sciences Building	2017-05-898	7	14.99	15:05	16:34	89	1334	2	0.001	SC/GS	Yes	Exterior sample for comparison.
6	Field blank	NA	NA	2017-05-900	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-05-901	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-05-902	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-05-903	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.

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Interpretation of Results

1) Within Ontario, the Occupational Health and Safety Act - Ontario Regulation 490/09 Designated Substances adopts the ACGIH TWA of 0.1 fibres/cc.

2) For each area tested compare the "Results f/cc" column to your area and how it compares to the above noted regulation.

Phase Contrast Microscopy Air Sampling Program, Medical Sciences Building, Floor 4, University of Toronto, May 8, 2017

Floor	Room	Description	Sample Location	Sample Number	Pump Number	Litres Per Minute	Time On	Time Off	Duration	Total Litres	Total Fibres	Results f/cc	Analyst	Within Acceptable Limits	Comments
4	4322K	Hallway	Central	2017-05-883	10	15.05	10:40	13:09	149	2242	8	0.002	SC/GS	Yes	Occupied.
4	4222K	Hallway	Central	2017-05-884	7	14.99	10:59	13:11	132	1979	6	0.001	SC/GS	Yes	Occupied.
4	4349K	Hallway	Central	2017-05-885	8	15.06	11:04	13:15	131	1973	8.5	0.002	SC/GS	Yes	Occupied.
4	4324K	Hallway	Central	2017-05-886	9	15	11:08	13:08	120	1800	11.5	0.003	SC/GS	Yes	Occupied.
4	4369K	Hallway	Central	2017-05-887	5	15.04	11:13	13:22	129	1940	9.5	0.002	SC/GS	Yes	Occupied.
4	4384K	Hallway	Central	2017-05-888	6	15.09	11:17	13:24	127	1916	6	0.001	SC/GS	Yes	Occupied.
4	4255K	Hallway	Central	2017-05-891	7	14.99	13:32	14:42	70	1049	6	0.002	SC/GS	Yes	Occupied.
4	4289K	Hallway	Central	2017-05-892	10	15.05	13:37	15:15	98	1475	6	0.002	SC/GS	Yes	Occupied.
4	4185K	Hallway	Central	2017-05-893	9	15	13:41	15:11	90	1350	5	0.002	SC/GS	Yes	Occupied.
4	4388K	Hallway	Central	2017-05-894	8	15.06	13:45	15:11	86	1295	4	0.001	SC/GS	Yes	Occupied.
4	4234	Elevator Lobby	Central	2017-05-895	5	15.04	13:54	15:24	90	1354	12	0.004	SC/GS	Yes	Occupied.
4	4224	Janitorial Room	Central	2017-05-896	6	15.09	14:01	15:28	87	1313	5	0.002	SC/GS	Yes	Not Occupied
	Exterior Control	NA	South of Medical Sciences Building	2017-05-897	2	15.03	14:37	16:28	111	1668	2.5	0.001	SC/GS	Yes	Exterior sample for comparison.
	Exterior Control	NA	North of Medical Sciences Building	2017-05-898	7	14.99	15:05	16:34	89	1334	2	0.001	SC/GS	Yes	Exterior sample for comparison.
6	Field blank	NA	NA	2017-05-900	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-05-901	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-05-902	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-05-903	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.

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Interpretation of Results

1) Within Ontario, the Occupational Health and Safety Act - Ontario Regulation 490/09 Designated Substances adopts the ACGIH TWA of 0.1 fibres/cc.

2) For each area tested compare the "Results f/cc" column to your area and how it compares to the above noted regulation.

Appendix B
LOCATION SPECIFIC REPORT

TABLE I
Results of Air Testing Associated with Asbestos Abatement
Gasket Installations
University of Toronto, Medical Sciences Building
May 8, 2017

Sample No.	Sample Location	Start Time	Stop Time	Sample Volume (L)	Airborne Fibre Conc. (f/cc)
2017-05-889	Lab 5344	12:50	14:25	96	0.004
2017-05-890	Lab 5342	13:03	14:31	98	0.001
2017-05-899	Lab 5366	14:47	16:22	95	0.001

May 11, 2017

Sample No.	Sample Location	Start Time	Stop Time	Sample Volume (L)	Airborne Fibre Conc. (f/cc)
2017-05-946	3320 Adjacent to 3312	9:02	10:26	1259	0.004
2017-05-954	7347k Adjacent to 7340	10:32	12:05	1394	0.004
2017-05-957	5322k Adjacent to 5312	12:49	14:26	1484	0.004

May 12, 2017

Sample No.	Sample Location	Start Time	Stop Time	Sample Volume (L)	Airborne Fibre Conc. (f/cc)
2017-05-970	4369k Adjacent to 4364	10:22	11:30	1025	0.005
2017-05-971	4350k Adjacent to 4351	12:52	14:08	1145	0.007

Appendix C
PUMP CALIBRATION SHEET

safeTECH
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Pump Calibration Form

Calibration Device: BIOS DryCal DC Lite HV

Date: May 12, 2017

Name: Josh Hain

Temperature: 22°C

Barometric Pressure: 101.2 KPa

Pump Number	Flow Rate (L/min)			Average Flow Rate (L/min)	Average Flow Rate (L/min) +10%	Average Flow Rate (L/min) - 10%
	Trial #1	Trial #2	Trial #3			
MSB -1	14.98	15.05	15.04	15.02	15.52	13.52
MSB-2	15.01	14.98	14.99	14.99	15.49	13.49
MSB -3						
MSB -4						
MSB-5	15.10	15.07	15.04	15.07	15.57	13.57
MSB -6	14.91	15.07	15.08	15.02	15.52	13.52
MSB -7	15.01	15.00	15.01	15.01	15.51	13.51
MSB-8	14.98	15.02	15.00	14.96	15.46	13.46
MSB -9	15.10	15.03	15.08	15.06	15.56	13.56
MSB -10	15.01	14.95	14.95	14.98	15.49	13.49

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Pump Calibration Form

Calibration Device: BIOS DryCal DC Lite HV

Date: May 11, 2017

Name: Josh Hamilton

Temperature: 22°C

Barometric Pressure: 101.7 kPa

Pump Number	Flow Rate (L/min)			Average Flow Rate (L/min)	Average Flow Rate (L/min) +10%	Average Flow Rate (L/min) - 10%
	Trial #1	Trial #2	Trial #3			
MSB -1	15.13	15.02	15.04	15.06	16.56	13.56
MSB-2	15.03	15.03	15.04	15.03	16.53	13.53
MSB -3						
MSB -4						
MSB-5	14.93	15.00	15.01	14.99	16.49	13.49
MSB -6	15.06	15.01	14.98	15.32	16.52	13.52
MSB -7	14.92	14.95	14.96	14.93	16.43	13.43
MSB-8	14.99	15.05	15.07	15.04	16.54	13.54
MSB -9	14.94	14.98	14.96	14.96	16.46	13.46
MSB -10	15.07	15.12	15.11	15.10	16.60	13.60

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Pump Calibration Form

Calibration Device: BIOS DryCal DC Lite HV

Date: May 10 2017

Name: Josh Hamilton

Temperature: 101.8 kPa

Barometric Pressure: 22°C

Pump Number	Flow Rate (L/min)			Average Flow Rate (L/min)	Average Flow Rate (L/min) +10%	Average Flow Rate (L/min) - 10%
	Trial #1	Trial #2	Trial #3			
MSB -1	14.87	14.99	14.98	14.95	16.45	13.45
MSB-2	15.02	15.03	15.01	15.02	16.52	13.52
MSB -3						
MSB -4						
MSB-5	14.90	14.99	14.99	14.96	16.46	13.46
MSB -6	15.04	15.03	15.06	15.04	16.54	13.54
MSB -7	15.01	15.00	14.95	14.99	16.49	13.49
MSB-8	15.21	15.05	15.04	15.10	16.60	13.60
MSB -9	15.07	15.03	15.03	15.04	16.54	13.54
MSB -10	15.04	15.02	15.03	14.97	16.47	13.47

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Pump Calibration Form

Calibration Device: BIOS DryCal DC Lite HV

Date: May 9 2017

Name: Josh Hamilton

Temperature: 22°C

Barometric Pressure: 102 kPa

Pump Number	Flow Rate (L/min)			Average Flow Rate (L/min)	Average Flow Rate (L/min) +10%	Average Flow Rate (L/min) - 10%
	Trial #1	Trial #2	Trial #3			
MSB -1	14.95	14.99	14.99	14.96	16.46	13.46
MSB-2	15.03	15.00	15.01	15.01	16.51	13.51
MSB -3						
MSB -4						
MSB-5	15.01	14.97	14.99	14.99	16.49	13.49
MSB -6	14.97	14.95	15.00	14.97	16.47	13.47
MSB -7	14.95	14.97	14.95	14.96	16.46	13.46
MSB-8	15.05	15.01	15.01	15.02	16.52	13.52
MSB -9	14.99	14.99	14.99	14.96	16.46	13.46
MSB -10	15.07	15.00	14.99	15.02	16.52	13.52

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safeTECH ENVIRONMENTAL LTD.

Pump Calibration Form

Calibration Device: BIOS DryCal DC Lite HV

Date: May 8, 2017

Name: Josh Hamilton

Temperature: 22°C

Barometric Pressure: 101.2 kPa

Pump Number	Flow Rate (L/min)			Average Flow Rate (L/min)	Average Flow Rate (L/min) +10%	Average Flow Rate (L/min) - 10%
	Trial #1	Trial #2	Trial #3			
MSB -1	14.93	14.99	14.99	14.97	16.47	13.47
MSB-2	15.02	15.00	15.02	15.03	16.53	13.53
MSB -3						
MSB -4						
MSB-5	15.01	15.02	15.05	15.04	16.54	13.54
MSB -6	15.32	14.95	14.99	15.09	16.59	13.59
MSB -7	15.02	14.97	14.99	14.99	16.49	13.49
MSB-8	15.05	15.09	15.03	15.06	16.56	13.56
MSB -9	15.01	14.99	14.99	15.00	16.50	13.50
MSB -10	15.07	15.04	15.05	15.05	16.55	13.55

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Appendix D
PCM ANALYSIS EXAMPLE CALCULATION SHEET

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PCM Air Sample Analysis

Project Name:	UofT Medical Sciences Building				
Project Number:	119917				
Sample ID:	2017-05-9166	Sample Type:	Ambient		
Sample Collected By:	JH	Date:	May 9 2017		
Sample Analyzed By:	JC/GS	Date:	May 9 2017		
Sample Location:	3249K Hallway				
Start Time:	12:05	Sample Duration (min)	150		
Finish Time:	14:35	Flow Rate (L/min)	15.02		

Volume (V)	2253 L	
Total Fibres Counted in Sample (FCS)	8 ~~100~~ fibres	
Total Fields Counted in Sample (FLS)	100 fields	
Reticle Field Area (RFA)	0.00801 mm²	
Area of Filter (AF)	385 mm²	
NIOSH 7400 Counting Rules Used	A	
Fibre Density (E)	— fibres/mm²	E = (FCS/FLS)/RFA
Fibre Concentration (C)	0.002 fibres/cc	C = (E*385)/(V*1000)

1	–	11	–	21	–	31	–	41	–	51	–	61	–	71	1	81	–	91	–
2	–	12	/	22	–	32	–	42	–	52	–	62	–	72	–	82	–	92	–
3	–	13	–	23	1	33	–	43	–	53	–	63	–	73	–	83	–	93	–
4	–	14	–	24	–	34	–	44	–	54	–	64	–	74	–	84	–	94	–
5	–	15	–	25	–	35	–	45	/	55	–	65	–	75	/	85	–	95	–
6	–	16	/	26	–	36	–	46	–	56	–	66	–	76	–	86	–	96	/
7	–	17	–	27	–	37	–	47	–	57	–	67	–	77	–	87	–	97	–
8	–	18	–	28	–	38	–	48	–	58	–	68	–	78	–	88	–	98	–
9	–	19	–	29	/	39	–	49	–	59	–	69	–	79	–	89	–	99	–
10	–	20	–	30	–	40	–	50	–	60	–	70	–	80	–	90	–	100	–

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