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ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-2-11 Test Number: F1

Filter ID: F04 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-2-11 08:44	N/A	N/A	0	212	68	25	SSM
12-5-11 08:30	193.17	N/A	72	180	69	27	SSM
12-5-11 10:25	193.26	0.08	74	181	69	29	SSM
12-5-11 12:44	193.23	0.03	76	181	61	39	SSM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 12/5/11

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-2-11 Test Number: F1

Filter ID: F015 SSM 12-5-1 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-2-11 08:49	N/A	N/A	0	212	68	25	SSM
12-5-11 08:23	188.92	N/A	72	182	69	27	SSM
12-5-11 10:26	188.95	0.03	74	181	69	29	SSM
12-5-11 12:46	188.96	0.01	76	181	69	31	SSM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF PUSKA (Print) _____ (Signature) Date 12/5/11

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-2-11 Test Number: F1

Filter ID: F06 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-2-11 08:49	N/A	N/A	0	212	68	25	SSM
12-5-11 08:24	189.02	N/A	72	182	69	27	SSM
12-5-11 10:27	189.01	0.01	74	181	69	29	SSM
12-5-11 12:47	189.05	0.04	76	181	69	31	SSM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 12-5-11

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-2-11 Test Number: F1

Filter ID: F07 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-2-11 08:49	N/A	N/A	0	212	68	25	SGM
12-5-11 08:20	184.42	N/A	72	182	69	27	SGM
12-5-11 10:29	184.47	0.05	SGM 12-5-11 74	181	69	29	SGM
12-5-11 12:49	184.49	0.02	76	181	69	31	SGM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA Date 12-5-11

Print Signature

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-7-11 Test Number: F2

Filter ID: F08 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-7-11 15:50	N/A	N/A	0	196	69	21	SSM
12-9-11 08:13	190.14	N/A	40	183	69	18	SSM
12-9-11 10:18	190.13	0.02	42	182	72	16	SSM
12-9-11 14:14	190.15	0.03	46	193	71	17	SSM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKE (Print) _____ (Signature) Date 12-9-11

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-7-11 Test Number: F2

Filter ID: F09 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-7-11 15:50	N/A	N/A	0	196	69	21	SSM
12-9-11 08:15	192.48	N/A	40	183	69	18	SSM
12-9-11 10:19	192.49	0.01	42	182	72	16	SSM
12-9-11 14:13	192.48	0.01	46	193	71	17	SSM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 12/9/11

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-7-11 Test Number: F2

Filter ID: F10 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-7-11 15:50	N/A	N/A	0	196	69	21	SSM
12-9-11 08:16	197.06	N/A	40	183	69	18	SSM
12-9-11 10:20	197.05	0.01	42	182	72	16	SSM
12-9-11 14:14	197.07	0.02	46	193	71	17	SSM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 12-9-11

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-7-11 Test Number: F2

Filter ID: F11 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-7-11 15:50	N/A	N/A	0	196	69	21	SSM
12-9-11 08:18	226.56	N/A	40	183	69	18	SSM
12-9-11 10:22	226.54	0.02	43	182	72	16	SSM
12-9-11 14:16	226.61	0.07	46	193	71	17	SSM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 12-9-11

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-7-11 Test Number: F2

Filter ID: F12 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-7-11 15:50	N/A	N/A	0	196	69	21	SSM
12-9-11 08:19	225.65	N/A	40	183	69	18	SSM
12-9-11 10:23	225.68	0.03	43	182	72	16	SSM
12-9-11 14:18	225.68	0.00	46	193	71	17	SSM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF PUSKA (Print) _____ (Signature) Date 12-9-11

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Date: 12-7-11 Test Number: F2

Filter ID: F13 Balance ID: SC-02

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-7-11 15:50	N/A	N/A	0	196	69	21	SSM
12-9-11 08:21	223.94	N/A	41	183	69	18	SSM
12-9-11 10:26	223.93	0.01	43	182	72	16	SSM
12-9-11 14:20	223.88	0.05	46	193	71	17	SSM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 12-9-11

ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-7-11 Test Number: F2

Filter ID: F14 Balance ID: SC-02

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-7-11 15:50	N/A	N/A	0	196	69	21	SSM
12-9-11 08:23	191.94	N/A	41	183	69	18	SSM
12-9-11 10:27	191.96	0.02	43	182	73	16	SSM
12-9-11 14:21	191.95	0.01	47	193	71	17	SSM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 12-9-11

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-7-11 Test Number: F2

Filter ID: F15 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-7-11 10:50	N/A	N/A	0	196	69	21	SSM
12-9-11 08:24	191.79	N/A	41	183	69	18	SSM
12-9-11 10:28	191.84	0.05	43	182	72	16	SSM
12-9-11 14:23	191.77	0.07	47	193	71	12	SSM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POOKS (Print) _____ (Signature) Date 12-9-11

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-7-11 Test Number: F2

Filter ID: F-16 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-7-11 15:50	N/A	N/A	0	196	69	21	SSM
12-9-11 08:26	198.34	N/A	41	183	69	18	SSM
12-9-11 10:30	198.33	0.01	43	182	72	16	SSM
12-9-11 14:35	198.28	0.05	47	193	71	17	SSM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 12-9-11

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-7-11 Test Number: F2

Filter ID: F17 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-7-11 16:00	N/A	N/A	0	212	69	21	SSM
12-9-11 08:30	189.51	N/A	41	194	70	17	SSM
12-9-11 10:34	189.54	0.03	43	167	71	16	SSM
12-9-11 14:32	189.58	0.04	47	170	70	16	SSM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 12-9-11

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-7-11 Test Number: F2

Filter ID: F18 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-7-11 16:00	N/A	N/A	0	212	69	21	SSM
12-9-11 08:31	184.90	N/A	41	194	70	17	SSM
12-9-11 10:35	184.94	0.04	43	167	71	16	SSM
12-9-11 14:34	184.98	0.04	47	170	70	16	SSM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 12/9/11

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-7-11 Test Number: F2

Filter ID: F19 Balance ID: SC-09

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-7-11 16:00	N/A	N/A	0	212	69	21	SSM
12-9-11 08:33	185.28	N/A	41	194	70	17	SSM
SSM 12-9-11 10:37 ;291	185.31	0.03	43	167	71	16	SSM
12-9-11 14:36	185.30	0.01	47	170	70	16	SSM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA Date 12-9-11

Print Signature

Use or disclosure of this document is subject to the restriction on the Cover Page.

ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-7-11 Test Number: F2

Filter ID: F20 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-7-11 16:00	N/A	N/A	0	212	69	21	SSM
12-9-11 08:35	199.69	N/A	41	194	70	17	SSM
12-9-11 10:38	199.67	0.02	43	167	71	16	SSM
12-9-11 14:37	199.66	0.01	47	170	70	16	SSM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF PUSKA (Print) _____ (Signature) Date 12-9-11

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-7-11 Test Number: F2

Filter ID: F21 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-7-11 16:00	N/A	N/A	0	213	69	21	SSM
12-9-11 08:36	189.33	N/A	41	194	70	17	SSM
12-9-11 10:40	189.38	0.05	43	167	71	16	SSM
12-9-11 14:39	189.35	0.03	47	170	70	16	SSM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 12-9-11

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-7-11 Test Number: F2

Filter ID: F22 Balance ID: ~~SS~~ SC-04 SSM 12-9-11

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-7-11 16:00	N/A	N/A	0	212	69	21	SSM
12-9-11 08:38	178.33	N/A	41	194	70	17	SSM
12-9-11 10:42	178.35	0.02	43	162	71	16	SSM
12-9-11 14:40	178.32	0.03	47	170	70	16	SSM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 12-9-11

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-7-11 Test Number: F2

Filter ID: F23 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-7-11 16:10	N/A	N/A	0	212	69	21	SSM
~~12-9-11 08:42~~ SSM 12-9-11 ~~16:10~~	189.40	N/A	41	187	73	15	SSM
12-9-11 10:15	189.45	0.05	43	178	71	17	SSM
12-9-11 14:43	189.39	0.06	47	186	70	17	SSM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF PUSKA (Print) _____ (Signature) Date 12-9-11

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-7-11 Test Number: F2

Filter ID: F24 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-7-11 16:10	N/A	N/A	0	212	69	21	SSM
12-9-11 08:49	183.60	N/A	41	187	73	15	SSM
12-9-11 10:47	183.64	0.04	43	178	71	17	SSM
12-9-11 14:45	183.62	0.02	47	186	70	17	SSM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 12-9-11

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-7-11 Test Number: F2

Filter ID: F25 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-7-11 16:10	N/A	N/A	0	213	69	21	SSM
12-9-11 08:46	188.23	N/A	41	187	73	15	SSM
12-9-11 10:49	188.26	0.03	43	178	71	17	SSM
12-9-11 14:47	188.28	0.02	47	186	70	17	SSM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKE (Print) _____ (Signature) Date 12-9-11

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ATTACHMENT 3 – FILTER PROCESSING LOG

Date: 12-7-11 Test Number: F2

Filter ID: F26 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-7-11 16:10	N/A	N/A	0	212	69	21	SSM
12-9-11 08:47	190.74	N/A	41	182	73	15	SSM
12-9-11 10:51	190.80	0.06	43	178	71	17	SSM
12-9-11 14:49	190.76	0.04	47	186	70	12	SSM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 12/9/11

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-7-11 Test Number: F2

Filter ID: F27 Balance ID: SC-09

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-7-11 16:10	N/A	N/A	0	212	69	21	SSM
12-9-11 08:49	183.96	N/A	41	187	73	15	SSM
12-9-11 10:52	183.99	0.05	43	178	71	17	SSM
12-9-11 14:52	184.03	0.08	47	186	70	17	SSM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 12-9-11

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-7-11 Test Number: F2

Filter ID: F2B Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-7-11 16:10	N/A	N/A	0	212	69	21	SSM
12-9-11 08:50	196.06	N/A	41	187	73	15	SSM
12-9-11 10:54	196.05	0.01	43	178	71	17	SSM
12-9-11 14:53	196.03	0.02	47	186	70	17	SSM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 12-9-11

ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-29-11 Test Number: 51

Filter ID: 501 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-29-11 9:24	N/A	N/A	0	260	70	24.5	MJ
12-30-11 10:42	181.67	N/A	25	212	68.3	31.7	MJ
12-30-11 12:51	181.68	0.01	27	203	68.9	32.6	MJ
1-1-12 10:45	181.68	0.00	73	146	68.1	26	

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 1/1/12

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-29-11 Test Number: 51

Filter ID: 502 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-29-11 9:25	N/A	N/A	0	260	70	24.5	MJ
12-30-11 10:44	178.70	N/A	25	212	68.3	31.7	MJ
12-30-11 12:53	178.71	0.01	27	203	68.9	32.6	MJ
1-1-12 10:45	178.68	0.03	73	196	68.3	25	[illegible]

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 1/1/12

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-29-11 Test Number: 51

Filter ID: 503 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-29-11 9:26	N/A	N/A	0	260	70	24.5	MJ
12-30-11 10:15	221.22	N/A	25	212	68.3	31.7	MJ
12-30-11 12:54	221.27	0.05	27	203	68.9	32.6	MJ
1-1-12 10:45	221.30	0.03	73	196	68.4	25	

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF PUSKA (Print) _____ (Signature) Date 1/1/12

Use or disclosure of this document is subject to the restriction on the Cover Page.

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-29-11 Test Number: 51

Filter ID: 504 Balance ID: SK-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-29-11 9:37	N/A	N/A	0	360	70	24.5	MJ
12-30-11 10:46	217.70	N/A	25	212	68.3	31.7	MJ
12-30-11 12:55	217.69	0.01	27	203	68.9	32.6	MJ
1-1-12 6:45	217.76	0.07	73	196	68	25	

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 1/1/12

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-29-11 Test Number: 51

Filter ID: 305 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-29-11 9:28	N/A	N/A	0	260	70	24.5	MJ
12-30-11 10:48	186.12	N/A	25	212	68.3	31.7	MJ
12-30-11 12:56	186.14	0.02	27	203	68.9	32.6	MJ
1-1-12 10:45	186.13	0.01	73	196	68	25	

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSK (Print) _____ (Signature) Date 1/1/12

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-29-11 Test Number: 51

Filter ID: 506 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-29-11 9:39	N/A	N/A	0	260	70	24.5	MJ
12-30-11 10:49	184.37	N/A	25	212	68.3	31.7	MJ
12-30-11 13:07	184.33	0.06	27	203	68.9	32.6	MJ
1-1-12 10:45	184.33	0.00	73	196	68	25	

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA Date 1/1/12

Print Signature

ALION SCIENCE AND TECHNOLOGY	Filter Bag Preparation and Processing Procedure		
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ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-29-11 Test Number: 51

Filter ID: 507 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-29-11 9:30	N/A	N/A	0	260	70	29.5	MJ
12-30-11 10:50	199.44	N/A	25	212	68.3	31.7	MJ
12-30-11 12:58	199.42	0.02	27	203	68.9	32.6	MJ
1-1-12 10:45	199.42	0.00	73	196	69	25	

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 1/1/12

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-29-11 Test Number: 51

Filter ID: 508 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-29-11 9:31	N/A	N/A	0	260	70	24.5	MJ
12-30-11 10:51	199.57	N/A	25	212	68.3	31.7	MJ
12-30-11 12:59	199.54	0.03	27	203	68.9	32.6	MJ
1-1-12 10:45	199.52	0.02	73	196	68	35	

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 1/1/12

ALION SCIENCE AND TECHNOLOGY	Filter Bag Preparation and Processing Procedure		
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ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-29 Test Number: S1

Filter ID: 509 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-29-11 9:32	N/A	N/A	0	260	70	29.5	MJ
12-30-11 10:52	185.61	N/A	25	212	68.3	31.7	MJ
12-30-11 13:01	185.64	0.03	27	203	68.9	32.6	MJ
1-1-12 10:45	185.68	0.04	73	196	68	25	~~MJ~~

MJ 12/30/11

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA Date 1/1/12

Print Signature

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-29-11 Test Number: 51

Filter ID: 510 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-29-11 9:33	N/A	N/A	0	260	70	24.5	MJ
12-30-11 10:53	181.97	N/A	25	212	68.3	31.7	MJ
12-30-11 13:02	181.96	0.01	27	203	68.9	32.6	MJ
1-1-12 10:45	181.93	0.03	73	196	68	25	

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 1/1/12

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-29-11 Test Number: S1

Filter ID: S11 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-29-11 9:34	N/A	N/A	0	260	70	24.5	MJ
12-30-11 10:54	191.84	N/A	25	212	68.3	31.7	MJ
12-30-11 13:03	191.84	0.00	27	203	68.9	32.6	MJ
1-1-12 10:45	191.85	0.01	73	196	68	25	[illegible]

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 1/1/12

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-29-11 Test Number: 51

Filter ID: 512 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-29-11 9:35	N/A	N/A	0	260	70	24.5	MJ
12-30-11 10:56	189.95	N/A	25	212	68.3	31.7	MJ
12-30-11 13:04	189.92	0.03	27	202	68.9	32.6	MJ
1-1-12 10:45	189.90	0.02	73	196	25	25	
					68.9		

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 1/1/12

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-29-11 Test Number: 51

Filter ID: 513 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-29-11 9:36	N/A	N/A	0	260	70	24.5	MJ
12-30-11 10:57	187.31	N/A	25	212	68.3	31.7	MJ
12-30-11 13:05	187.30	0.01	27	203	68.9	32.6	MJ
1-1-12 10:45	187.33	0.03	73	196	69	25	

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF PUSKE Date 1/6/12
Print Signature

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 12-29-11 Test Number: 31

Filter ID: 314 Balance ID: 3C-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
12-29-11 9:37	N/A	N/A	0	260	70	24.5	MJ
12-30-11 10:58	191.27	N/A	25	212	68.3	31.7	MJ
12-30-11 13:06	191.30	0.03	27	203	68.9	32.6	MJ
1-1-12 10:45	191.28	0.02	73	196	69	25	[illegible]

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 1/1/12

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 7/31/12 Test Number: ALION-SPP-BWROG-7337-052

Filter ID: 112 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
8-2-12 / 10:49	N/A	N/A	0	230	83.8	50.1	MI
8-3-12 / 11:53	205.24	N/A	~25	203	86	43.6	FB
8-3-12 / 14:06	205.41	0.17	~27	182	93.7	35.5	CL
8-3-12 15:17	205.41	0	29	155	95.3	28.3	CL
8-3-12 CL 8/3/12 19:08	205.44	0.03	31	192	94.6	29.7	CL
8-3-12 23:10	205.43	0.01	35 (190)	~~183~~	96.4	32.1	RR
				CL 8/3/12			

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 8/4/12

ALION SCIENCE AND TECHNOLOGY	Filter Bag Preparation and Processing Procedure		
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ATTACHMENT B – FILTER PROCESSING LOG

Date: 7/31/12 Test Number: ALION-SPP-BWROG-7337-052

Filter ID: 113 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
8-2-12 / 10:49	N/A	N/A	0	230	83.8	50.1	MJ
8-3-12 / 11:55	201.65	N/A	~25	203	86	43.7	FB
8-3-12 14:09	201.87	0.22	~27	182	93.5	35.1	LL
8-3-12 ~~14:18~~ 16:18	201.89	0.02	~29	153	95.3	27.9	LL
8-3-12 19:09	201.87	0.02	31	192	94.6	29.8	LL
8-3-12 23:11	201.91	0.04	35	194	89.4	33.1	RR

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 8/4/12

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 7/31/12 Test Number: ALION-SPP-BWROG-7337-052

Filter ID: 114 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
8-2-12/10:49	N/A	N/A	0	230	83.8	50.1	MJ
8-3-12/11:56	258.70	N/A	~25	203	86	43.4	FB
8-3-12 14:10	259.00	0.3	~27	182	95.5	~~43.1~~ 43.2	8/3/12
8-3-12 16:19	258.98	0.02	29	153	95.3	27.8	CL
8-3-12 19:10	258.96	0.02	31	192	94.6	29.5	LL
8-3-12 23:12	258.94	0.02	~~35~~ 35	198	89.4	33.4	RR
			8/3/12				

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 8/4/12

ALION SCIENCE AND TECHNOLOGY	Filter Bag Preparation and Processing Procedure		
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ATTACHMENT B – FILTER PROCESSING LOG

Date: 7/31/12 Test Number: ALION-SPP-BWROG-7337-052

Filter ID: 115 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
8-2-12/10:49	N/A	N/A	0	230	83.8	20.1	MJ
8-3-12/11:57	258.65	N/A	~25	201	87	43.5	FB
8-3-12 14:11	258.93	0.28	~27	182	93.5	35	LL
8-3-12 16:20	258.80	0.13	29	183	95.5	28.0	RR
8-3-12 19:11	258.79	0.01	31	192	94.6	29.5	LL
8-3-12 21:34	258.75	0.04	34	183	90.8	34.1	LL
8-3-12 23:13	258.80	0:05	36	198	88.0	32.3	RR
8-5-13 8:22	PLACED BACK IN OVEN			204	76.3	24.7	MJ
8-5-13 10:57	258.73	0.07	38	161	69.8	22.6	MJ
8-6-13 08:38	258.76	0.03	61	198 SSM 188	71	20	SSM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 8/4/12

ALION SCIENCE AND TECHNOLOGY	Filter Bag Preparation and Processing Procedure		
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ATTACHMENT B – FILTER PROCESSING LOG

Date: 7/31/12 Test Number: ALION-SPP-BWROG-7337-052

Filter ID: 116 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
8-2-12 / 10:49	N/A	N/A	0	230	83.8	30.1	MJ
8-3-12 / 11:59	215.35	N/A	~25	203	87	33.4	FB
8-3-12 14:11	215.54	0.19	~27	182	93.5	35.2	LL
8-3-12 16:20	215.43	0.11	29	157	95.5	27.9	RR
8-3-12 19:13	215.45	0.02	31	192	96.6	29.4	LL
8-3-12 21:35	215.40	0.05	34	183	90.8	34.0	LL
8.3.12 23:20	215.41	0.01	36	198	89.4	32.0	RR
3-5-13 8:22	PLACED BACK IN OVEN			204	76.3	24.7	MJ
3-5-13 10:58	215.35	0.06	38	161	69.8	22.6	MJ
3-6-13 08:40	215.36	0.01	61	177	71	20	SSM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 8/4/12

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 7/31/12 Test Number: ALION-SPP-BWROG-7337-052

Filter ID: 117 Balance ID: SC-C4

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
8-2-12 / 10:49	N/A	N/A	0	230	83.8	50.1	MJ
8-3-12 / 12:00	210.85	N/A	~25	203	87	42.8	FB
8-3-12 14:12	210.97	0.12	~27	182	93.5	35.5	CC
8-3-12 16:28	210.80	0.17	29	153	91.3	28.0	RR
8-3-12 19:13	210.77	0.03	31	192	94.6	29.5	CC
8-3-12 21:35	210.75	0.02	34	183	90.8	33.4	CC
8-3-12 23:21	210.81	0.06	36	198	89.4	32.0	RR
3-5-13 8:22	PLACED BACK IN OVEN			204	76.3	29.7	MJ
3-5-13 10:59	210.80	0.01	38	161	69.8	22.6	MJ MJ 3/5/13
3-6-13 08:42	210.82	0.02	61	177	71	20	SSM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) (Signature) Date 8/4/12

ALION SCIENCE AND TECHNOLOGY	Filter Bag Preparation and Processing Procedure		
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ATTACHMENT B – FILTER PROCESSING LOG

Date: 7/31/12 Test Number: ALION-SPP-BWROG-7337-052

Filter ID: 118 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
8-2-12 / 10:49	N/A	N/A	0	230	83.5	50.1	MJ
8-3-12 / 12:01	195.70	N/A	~25	203	87	42.4	FB
8-3-12 14:13	195.80	0.1	27	182	93.5	35.7	LL
8-3-12 16:25	196.08	0.28	29	113	95.5	27.8	RR
8-3-12 19:05	196.00	0.08	31	192	94.6	29.7	CL
8-3-12 21:36	195.97	0.03	34	183	90.8	33.1	CL
8-4-12 23:22	196.00	0.03	36	198	89.6	32.5	RR
3-5-13 8:22	PLACED BACK IN OVEN			204	76.3	24.7	MJ
3-5-13 11:00	195.94	0.06	38	161	69.8	22.6	MJ
3-6-13 08:44	195.85	0.09	61	177	71	20	SSM
3-6-13 11:23	195.82	0.03	63	192	72	22	SSM
3-6-13 13:34	195.87	0.05	65	192	69	26	SSM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 8/4/12

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ATTACHMENT B – FILTER PROCESSING LOG

Date: 7/31/12 Test Number: ALION-SPP-BWROG-7337-052

Filter ID: 119 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
8-2-12/10:49	N/A	N/A	0	230	83.8	50.1	MJ
8-3-12/12:03	196.42	N/A	~25	203	87	42.3	FR
8-3-12 14:14	196.53	0.11	27	182	93.5	35.9	CL
8-3-12 16:37	196.70	0.17	29	178	95.7	27.5	RR
8-3-12 19:16	196.54	0.16	31	192	94.6	29.9	CL
8-3-12 21:37	196.56	0.02	34	183	90.8	33.0	CL
8-3-12 23:23	196.61	0.05	36	198	89.2	33.0	RR
3-5-13 8:22	PLACED BACK IN OVEN			204	76.3	24.7	MJ
3-5-13 11:01	196.58	0.03	38	161	69.8	22.6	MJ
3-6-13 08:46	196.53	0.05	61	177	71	20	SSM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 8/4/12

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ALION SCIENCE AND TECHNOLOGY	Filter Bag Preparation and Processing Procedure		
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ATTACHMENT B – FILTER PROCESSING LOG

Date: 7/31/12 Test Number: ALION-SPP-BWROG-7337-052

Filter ID: 120 Balance ID: SL-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
8-2-12/10:49	N/A	N/A	0	230	83.8	30.1	MJ
8-3-12/12:04	191.39	N/A	~25	203	87	42.6	FB
8-3-12 14:15	191.58	0.19	27	182	93.7	36.3	CL
8-3-12 16:38	191.66	0.11	29	153	95.7	37.2	RR
8-3-12 19:17	191.60	0.09	31	192	94.2	30.1	CL
8-3-12 21:38	191.52	0.08	34	183	90.8	33.0	CL
8-3-12 23:25	191.58	0.06	36	188	89.3	32.7	RR
3-5-13 8:22	PLACED BACK IN OVEN			204	76.3	24.7	MJ
3-5-13 11:03	191.63	0.05	38	161	69.8	22.6	MJ MJ 3/5/13
3-5-13 13:05	191.57	0.06	40	203	69.4	26.8	MJ
3-6-13 08:49	191.57	0.00	61	199	71	20	GSM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) (Signature) Date 8/9/12

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ALION SCIENCE AND TECHNOLOGY	Filter Bag Preparation and Processing Procedure		
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ATTACHMENT B – FILTER PROCESSING LOG

Date: 7/31/12 Test Number: ALION-SPP-BWROG-7357-052

Filter ID: 121 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
8-2-12 10:49	N/A	N/A	0	230	83.8	50.1	MJ
8-3-12 12:06	212.28	N/A	~25	203	88	42.6	FB
8-3-12 14:16	212.48	0.2	27	[illegible] SMG	93.7	36.0	CC
8-3-12 16:30	212.51	0.03	29	NJ	87.5	29.4	RR
8-3-12 19:19	212.31	0.2	31	192	90.2	30.2	CC
8-3-12 21:39	212.32	0.01	34	183	90.8	33.3	CC
8-3-12 23:56	212.37	0.05	36	198	89.8	32.4	RR
3-5-13 8:22	PLACED BACK IN OVEN			204	76.3	24.7	MJ
3-5-13 11:05	212.30	0.07	38	161	69.8	22.6	MJ
3-6-13 08:51	212.32	0.02	61	177	71	20	SSM

SSM 3/6/13

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 8/14/12

ATTACHMENT B – FILTER PROCESSING LOG

Date: 7/31/12 Test Number: ALION-SPP-BWROG-7337-052

Filter ID: 122 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
8-2-12 10:49	N/A	N/A	0	230	83.8	50.1	MJ
8-3-12 12:07	184.87	N/A	~25	203	88	42.7	FB
8-3-12 14:16	185.04	0.17	27	182	93.7	36.3	CL
8-3-12 16:31	185.10	0.06	29	153	95.5	29.7	RR
8-3-12 19:19	184.89	0.21	31	192	94.2	36.4	CL
8-3-12 21:39	184.83	0.06	34	183	90.8	32.9	CL
8-3-12 23:28	184.88	0.05	36	196	89.3	33.4	RR
3-5-13 8:22	PLACED BACK IN OVEN			204	76.3	24.7	MJ
3-5-13 11:07	184.83	0.05	38	161	69.8	22.6	MJ
3-6-13 08:53	184.89	0.06	61	177	71	20	SSM

SSM 3-6-13

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) (Signature) Date 8/4/12

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ALION SCIENCE AND TECHNOLOGY	Filter Bag Preparation and Processing Procedure		
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ATTACHMENT B – FILTER PROCESSING LOG

Date: 7/31/12 Test Number: ALION-SPP-BWROG-7337-052

Filter ID: 123 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
8-2-12/10:49	N/A	N/A	0	230	83.8	50.1	MJ
8-3-12/12:09	203.36	N/A	~25	203	88	42.1	FB
8-3-12 14:17	203.54	0.18	27	182	93.9	35.7	LL
8-3-12 16:32	203.49	0.05	29	153	95.5	27.2	RB
8-3-12 19:21	203.36	0.13	32 31	192	94.1	30.6	LL
8-3-12 21:41	203.27	0.09	35 34	183	90.8	32.8	LL
8-3-12 23:30	203.31	0.04	36	198	89.2	32.7	RB
8-6-12 16:04	Place J back in oven			202	89.6	34.6	DD
8-6-12 18:29	203.29	0.02	38.4	197	91.2	36.6	D

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 8/4/12

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ALION SCIENCE AND TECHNOLOGY	Filter Bag Preparation and Processing Procedure		
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ATTACHMENT B – FILTER PROCESSING LOG

Date: 7/31/12 Test Number: ALION-SPP-BWROG-7337-052

Filter ID: 124 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
8-2-12/10:49	N/A	N/A	0	205	83.8	30.1	MJ
8-3-12/12:11	199.06	N/A	~25	201	88	42.1	FB
8-3-12 14:25	198.99	0.07	28.27	205	94.2	35.7	CC
8-3-12 16:33	199.48	0.49	30.59	203	93.3	37.1	RR
8-3-12 19:27	199.16	0.32	32	202	94.1	31.3	CC
8-3-12 21:42	199.18	0.02	35	205	90.8	32.9	CC
8-3-12 23:32	199.21	0.03	37	205	89.0	33.4	RR
3-5-13 8:22	PLACED BACK IN OVEN			204	76.3	24.7	MJ
3-5-13 11:08	199.17	0.04	39	161	69.8	22.6	MJ
3-6-13 08:56	199.19	0.02	61	177	71	20	SSM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 8/14/12

ALION SCIENCE AND TECHNOLOGY	Filter Bag Preparation and Processing Procedure		
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ATTACHMENT B – FILTER PROCESSING LOG

Date: 7/31/12 Test Number: ALION-SPP-BWROG-7337-052

Filter ID: 125 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
8-2-12 10:49	N/A	N/A	0	205	83.8	50.1	MJ
8-3-12 12:13	191.09	N/A	~25	201	88	41.5	FB
8-3-12 14:26	191.04	0.05	27	201	94.2	35.5	LL
8-3-12 16:35	191.60	0.56	39	203	95.3	26.9	RA
8-3-12 19:28	191.16	0.44	32	202	94.1	31.6	LL
8-3-12 21:42	191.15	0.01	35	205	90.8	33.1	LL
8-3-12 23:33	191.21	0.06	37	205	95.0	32.3	RA
3-5-13 8:22	PLACED BACK IN OVEN			204	76.3	24.7	MJ
3-5-13 11:09	191.15	0.06	39	161	69.8	22.6	MJ
3-6-13 08:58	191.16	0.01	61	177	71	20	SSM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 8/4/12

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ALION SCIENCE AND TECHNOLOGY	Filter Bag Preparation and Processing Procedure		
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ATTACHMENT B – FILTER PROCESSING LOG

Date: 7/31/12 Test Number: ALION-SPP-BWROG-7337-052

Filter ID: 126 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
8-2-12 / 10:49	N/A	N/A	0	205	83.8	30.1	MJ
8-3-12 / 12:12	199.48	N/A	~25	201	88	42.0	FB
8-3-12 14:26	199.50	0.02	27.27	201	94.2	35.3	CC
8-3-12 16:37	199.70	0.2	30.79	203	95.5	27.1	AR
8-3-12 19:28	199.52	0.18	32	202	94.1	31.4	CC
8-3-12 21:43	199.58	0.06	35	205	90.8	33.0	CC
8-3-12 23:35	199.62	0.04	37	205	89.0	32.6	AR
8-7-12 15:15	Placed back in oven		37	198	91	37.6	CC
8-7-12 20:45	199.56	0.06	43	1945	89	44.2	CC

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) (Signature) Date 8/8/12

ALION SCIENCE AND TECHNOLOGY	BWROG ECCS Strainer Bypass Test Report		
	Document No: BWROG-ECCS-TA13-004	Revision: 1	Page: M-215 of M-219

ALION SCIENCE AND TECHNOLOGY	Filter Bag Preparation and Processing Procedure		
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ATTACHMENT B – FILTER PROCESSING LOG

Date: 7/31/12 Test Number: ALION-SPP-BWROG-7337-052

Filter ID: 127 Balance ID: 5c-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
8-2-12 /16:49	N/A	N/A	0	205	83.8	30.1	MJ
8-3-12/12:15	202.33	N/A	~25	201	88	41.2	FB
8-3-12 14:27	202.35	0.02	27	201	94.2	35.1	LL
8-3-12 16:38	202.55	0.2 LL 8/3/12	39	203	95.7	29.0	RR
8-3-12 19:29	202.35	0.2 LL 8/4/12	32	202	93.9	31.6	LL
8-3-12 21:44	202.40	0.05	35	205	90.8	33.2	LL
8-3-12 23:36	202.37	0.03	37	205	89.1	32.5	RR
3-5-13 8:22	PLACED BACK IN OVEN			204	76.3	24.7	MJ
3-5-13 11:11	202.47	0.075	39	161	69.8	22.6	MJ
		MJ 3/5/13					MJ 3/5/13
3-6-13 09:00	202.44	0.02	61	177	71	20	SSM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 8/4/12

ALION SCIENCE AND TECHNOLOGY	Filter Bag Preparation and Processing Procedure		
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ATTACHMENT B – FILTER PROCESSING LOG

Date: 7/31/12 Test Number: ALION-SPP-BWROG-7337-052

Filter ID: 130 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
8-2-12 10:49	N/A	N/A	0	205	83.8	50.1	MJ
8-3-12 12:20	198.83	N/A	~25	201	88	42	FB
8-3-12 14:31	198.79	0.04	28	201	94.2	34.4	LL
8-3-12 16:41	198.89	0.1	30	203	95.9	27.0	RR
8-3-12 19:31	198.80	0.09	32	202	93.9	31.8	LL
8-3-12 21:45	198.81	0.01	35	205	90.8	32.9	LL
8-3-12 23:41	198.86	0.05	37	205	89.0	32.9	RR
3-5-13 8:22	PLACED BACK IN OVEN			204	76.3	24.7	MJ
3-5-13 11:14	198.89	0.08	39	161	69.8	22.6	MJ
3-6-13 09:04	199.04	0.15	61	177	70	21	SSM
3-6-13 11:25	199.06	0.02	63	192	72	22	SSM
3-6-13 13:37	199.03	0.03	65	192	69	26	SSM

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 8/4/12

ALION SCIENCE AND TECHNOLOGY	Filter Bag Preparation and Processing Procedure		
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ATTACHMENT B – FILTER PROCESSING LOG

Date: 7/31/12 Test Number: ALION-SPP-BWROG 7337-052

Filter ID: 128 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
8-2-12 10:49	N/A	N/A	0	205	53.8	50.1	MJ
8-3-12 12:16	186.80	N/A	~25	201	88	41	FB
8-3-12 14:28	~~186.72~~	0.02	27	201	94.2	35	CC
	186.82 Final	Tare 8/16/12	CC 8/8/12				
8-3-12 16:39	186.90	0.08	29	203	95.9	26.9	RR
8-3-12 19:29	186.82	0.08	32	202	93.9	32.0	CC
8-3-12 23:37	186.88	0.06	36	201	88.8	32.9	RR

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) (Signature) Date 8/4/12

ALION SCIENCE AND TECHNOLOGY	Filter Bag Preparation and Processing Procedure		
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ATTACHMENT B – FILTER PROCESSING LOG

Date: 7/31/12 Test Number: ALION-SPP-BWROG-7337-052

Filter ID: 129 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
8-2-12 10:49	N/A	N/A	0	205	93.8	50.1	MJ
8-3-12 12:18	197.33	N/A	~25	201	88	41	FB
8-3-12 14:29	197.30	0.03	28	201	94.4	35	CC
8-3-12 16:40	197.39	0.09	30	203	95.7	37.0	RR
8-3-12 19:30	197.28	0.11	32	202	93.9	32	CC
8-3-12 21:45	197.32	0.04	35	205	90.8	33.1	CC
8-3-12 23:39	197.36	0.04	37	205	89.1	32.9	RR
3-5-13 8:22	PLACED BACK IN OVEN			204	76.3	24.7	MJ
3-5-13 11:13	197.35	0.01	39	161	69.8	22.6	MJ
3-6-13 09:02	197.35	0.06	61	177	71	20	SSM

Comments: _____

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Test Coordinator JEFF POSKA (Print) (Signature) Date 8/4/12

ALION SCIENCE AND TECHNOLOGY	Filter Bag Preparation and Processing Procedure		
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ATTACHMENT B – FILTER PROCESSING LOG

Date: 7/31/12 Test Number: ALION-SPP-BWROG-7337-052

Filter ID: 131 Balance ID: SC-04

Date & Time	Filter Weight (g)	Weight Difference (g)	Total Drying Time (hours)	Oven Temp. (°F)	Room Temp. (°F)	Room Humid. (%)	Initials
8-2-12/10:49	N/A	N/A	0	205	83.8	50.1	MJ
8-3-12/12:21	197.71	N/A	~25	201	88	41	FB
8-3-12 14:31	197.67	0.04	28	201	94.2	34.4	CL
8-3-12 16:48	197.71	0.04	30	202	95.9	29.0	RR
8-3-12 19:32	197.69	0.02	32	202	93.7	32	CL
~~21:46~~	~~197.66~~						
	CL 8/3/12						
8-3-12 23:42	197.71	0.02	36	205	82.8	33.4	RR

Comments: _____

NOTE: A copy of this page should be used for each filter bag. The Test Coordinator should sign this document when the corresponding filter has been fully processed per the instructions in Appendix 2 – Filter Bag Processing Checklist.

Test Coordinator JEFF POSKA (Print) _____ (Signature) Date 8/4/12

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ATTACHMENT N

Fiber Bypass Results

Test C1		
Theoretical Bed Thickness (in)	Recovered Fiber (g)	Accumulated Fiber (g)
0	0.79	0.79
0.017	30.08	30.87
0.034	25.30	56.17
0.05	25.08	81.25
0.07	23.67	104.92
0.09	22.26	127.18
0.10	18.63	145.81
0.12	16.17	161.98
0.136	11.96	173.94
0.153	8.46	182.4
0.17	5.32	187.72
0.187	3.12	190.84
0.204	1.18	192.02
0.221	0.80	192.82
0.238	0.57	193.39
0.255	0.37	193.76
0.272	0.52	194.28
0.289	1.46	195.74
0.306	0.68	196.42
0.323	0.19	196.61
0.34	0.50	197.11
0.357	0.56	197.67
0.374	0.54	198.21
0.391	0.38	198.59
0.408	0.19	198.78
0.425	0.33	199.11
0.442	0.12	199.23
0.459	0.54	199.77
0.476	0.48	200.25
0.493	0.38	200.63
0.51	0.52	201.15
0.527	0.44	201.59
0.544	0.15	201.74

Test C2		
Theoretical Bed Thickness (in)	Recovered Fiber (g)	Accumulated Fiber (g)
0	0.81	0.81
0.0625	66.10	66.91
0.126	46.23	113.14
0.19	12.12	125.26
0.25	2.61	127.87
0.32	1.60	129.47
0.38	0.85	130.32
0.44	0.94	131.26
0.504	0.95	132.21
0.567	1.07	133.28
0.63	0.59	133.87
0.693	0.43	134.30
0.756	0.43	134.73

Test C3		
Theoretical Bed Thickness (in)	Recovered Fiber (g)	Accumulated Fiber (g)
0	0.36	0.36
0.125	86.81	87.17
0.25	3.20	90.37
0.38	2.50	92.87
0.50	1.30	94.17
0.63	0.95	95.12
0.75	0.84	95.96

Test C3.2		
Theoretical Bed Thickness (in)	Recovered Fiber (g)	Accumulated Fiber (g)
0	0.63	0.63
0.125	79.79	80.42
0.25	3.04	83.46
0.38	1.37	84.83
0.50	1.52	86.35

Test C4		
Theoretical Bed Thickness (in)	Recovered Fiber (g)	Accumulated Fiber (g)
0	0.55	0.55
0.25	155.47	156.02
0.5	2.72	158.74
0.75	1.73	160.47

Test C5		
Theoretical Bed Thickness (in)	Recovered Fiber (g)	Accumulated Fiber (g)
0	0.22	0.22
0.75	181.94	182.16

Test D1		
Theoretical Bed Thickness (in)	Recovered Fiber (g)	Accumulated Fiber (g)
0	0.58	0.58
0.125	65.62	66.2
0.25	1.83	68.03
0.38	1.18	69.21
0.50	1.00	70.21
0.63	0.82	71.03
0.75	0.58	71.61

Test D2		
Theoretical Bed Thickness (in)	Recovered Fiber (g)	Accumulated Fiber (g)
0	0.72	0.72
0.125	232.82	233.54
0.25	18.16	251.7
0.38	0.80	252.5
0.50	0.65	253.15
0.63	0.66	253.81
0.75	0.61	254.42

Test F1		
Theoretical Bed Thickness (in)	Recovered Fiber (g)	Accumulated Fiber (g)
0	0.30	0.3
0.125	53.98	54.28
0.25	2.34	56.62
0.38	1.63	58.25
0.50	1.21	59.46
0.63	0.95	60.41
0.75	1.00	61.41

Test F2		
Theoretical Bed Thickness (in)	Recovered Fiber (g)	Accumulated Fiber (g)
0	1.97	1.97
0.125	120.70	122.67
0.25	27.15	149.82
0.38	2.59	152.41
0.50	1.34	153.75
0.63	1.41	155.16
0.75	1.20	156.36

Test S1		
Theoretical Bed Thickness (in)	Recovered Fiber (g)	Accumulated Fiber (g)
0	0.30	0.30
0.125	75.37	75.67
0.25	3.07	78.74
0.38	1.58	80.32
0.50	0.40	80.72
0.63	1.09	81.81
0.75	1.07	82.88

ATTACHMENT O

SEM Analysis

ALION SCIENCE AND TECHNOLOGY

TECHNICAL DOCUMENT COVER PAGE

Document No: BWROG-ECCS-TA13-003	Revision: 0	Page 1 of 91
Document Title: BWROG Downstream Effects Scanning Electron Microscope Analysis		
Project No: 07337-007		
Project Name: GEH: BWROG ECCS COMMITTEE TECH. SUPPORT		
Client: General Electric Hitachi		

Document Purpose/Summary:

The purpose of this document is to determine the effects of various debris types and strainer hole sizes and their correlation to the debris obtained downstream of the Bypass Test. Three samples were taken from four filter bags, for a total of twelve samples. Each of the samples was analyzed to establish a distribution of fiber debris length.

This test report is prepared Safety-related in accordance with the Alion Science and Technology ITSO Nuclear Quality Assurance Program.

Total Page Count: 153pages including Appendices and Attachments.

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**Measured Rockwool and NUKON 3/32"
***Reviewed Technical Document, NUKON 1/8" and Temp-Mat measurement
****Reviewed Rockwool and NUKON 3/32" Measurements

Form 3.3.1
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ALION SCIENCE AND TECHNOLOGY

REVISION HISTORY LOG

Page: 2 of 91

Document Number: BWROG-ECCS-TA13-003 Revision: 0

Document Title: BWROG Downstream Effects Scanning Electron Microscope Analysis

Instructions:

Project Manager to provide a brief description of each document revision, including rationale for the change and, if applicable, identification of source documents used for the change.

REVISION	DATE	DESCRIPTION
0	See Cover Page	Original Issue

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Attachment C: FE-SEM Image Logs ..... 5 Pages
Attachment D: FE-SEM Measurement Spreadsheets ..... 27 Pages
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Acronyms and Definitions

Acronym	Definition
ECCS	Emergency Core Cooling System
FE-SEM	Field Emission Scanning Electron Microscopy
GEH	General Electric Hitachi
GIMP	GNU Image Manipulation Program
GSI	Generic Safety Issue
JPEG	Joint Photographic Experts Group
LOCA	Loss of Coolant Accident
MRS	Measurement Reference Standard
NPSH	Net Positive Suction Head
QA	Quality Assurance
TIF / TIFF	Tagged Image File Format
UNL	University of Nebraska - Lincoln

1- Background

An assessment of a hypothetical Loss of Coolant Accident (LOCA) at Nuclear Plants has determined that there is a possibility that containment insulation materials dislodged by the high-energy line break could transport to the containment sump and interfere with the ability of the emergency core cooling system (ECCS) to provide adequate cooling to the reactor core. This assessment is referred to as the GSI-191 issue. It is necessary to estimate the types and quantities of such insulation debris transported to the sump screen, as well as the pressure drop associated with the flow of cooling water through this debris layer. The goal of such an assessment is to demonstrate that adequate sump screen area is available relative to the types and quantities of debris generated such that the debris pressure drop does not challenge the available net positive suction head (NPSH) of the ECCS pumps.

An additional issue related to GSI-191 is the evaluation of Downstream Effects. The Downstream Effects relate to material that can potentially flow through a sump screen and be entrained downstream of a sump strainer. Since the particulate portion of post-LOCA debris is much smaller than the perforations of ECCS suction strainers, the bypass testing will only consider fibrous debris. In order to assess material that could potentially pass through a sump screen, a debris bypass test was conducted in the Alion hydraulic laboratory. The test was performed such that material that passed through the sump screen was captured in filter bags, and was collected for further characterization. The scope of this report will be to perform a characterization of the debris obtained downstream of the BWROG Bypass Test. Four tests were conducted for this testing with the first being NUKON fibers with a strainer hole size of 1/8", the second using Temp-Mat, the third using Rockwool, and the fourth and final utilizing NUKON fibers with strainers holes of 3/32". Three samples were taken from four filter bags, one from each test, for a total of twelve samples. These twelve samples were analyzed for Material Characterization using scanning electron microscopy.

The filter bags used in the BWROG Bypass Test were polyester multifilament mesh filter bags with a ring diameter of 7" and bag length of 32" and had a 5 micron opening. Two filter bags were used to sieve NUKON debris from the recirculating water, and two filter bags were used as a control.

The NUKON used in testing is consistent with the fiberglass, Temp Mat, and/or Rockwool material that is installed at BWROG, as described in the BWROG bypass test plan (1). This NUKON had an as-fabricated density of 2.4 lb_m/ft^3, the Temp-Mat has an as-fabricated density of 11.8 lb_m/ft^3, and the Rockwool has an as-fabricated density of 4 to 10 lb_m/ft^3.

2- Purpose

The purpose of this report is to document the measurement of the characteristic size of the materials from the Bypass Tests conducted at the Alion hydraulics laboratory.

2.1- Scope

Alion tested the samples for material characteristics (fiber length) under the Alion SEM Examination Procedure (2). The material characterization was performed by Field Emission Scanning Electron Microscopy (FE-SEM) imaging. The purpose of FE-SEM is to substantiate fiber length. Fiber lengths can

be measured directly from FE-SEM images that have been calibrated with a known measurement reference standard (MRS).

Each of the samples was analyzed to establish a distribution of fiber debris length. Digital images are provided in this report from the FE-SEM examinations (Section 8.2).

Note that three samples were taken from four filter bags, for a total of twelve samples. Each of the samples was analyzed to establish a distribution of fiber debris length. The samples were taken from the top, middle, and lower portions of each bag. Each sample from the filter bags was able to be gently extricated without any pulling or cutting.

3- Methodology

The methodology utilized for each insulation sample using FE-SEM measurement shall comprise of first performing a receipt inspection as noted in Section 4.1. Then for each sample, a sample preparation shall be performed in accordance with Section 4.2.2. Next, the FE-SEM calibration shall be performed to ensure accurate and traceable measurements in accordance with Section 5. Individual sample measurements will be performed in accordance with the guidance provided in Section 6.

4- Procedure

See Attachment A for the actual procedures utilized for the data acquisition and receipt inspections.

4.1- Receipt Inspection MRS and Samples

Receipt inspection was performed on the MRS and is documented in Attachment B. Receipt inspections were noted and documented on individual forms for each Filter Bag sample, and are provided in Attachment B. Unique ID numbers were provided for each sample. A material control log was completed for each sample. These logs are for sample inventory and control only and not relevant for actual testing.

4.2- FE-SEM Process

4.2.1- Background

FE-SEM process for image acquisition was documented per the Alion SEM Examination Procedure (2). Images were collected on a UNL Micro-Biology Laboratory Dept., Field Emission Scanning Electron Microscope system on March 2, 2012. Three samples were taken from four filter bags, for a total of twelve samples. Each of the samples was analyzed to establish a distribution of fiber debris length. Five images were taken from each sample. The first four sample images were taken at 50X magnification, and the last sample image was taken at 25X magnification.

4.2.2- Sample Preparation and Handling

Prior to performing FE-SEM imaging, small samples were extracted from each filter bag and noted as, for example, ID "C1", "D1", "R1", or "S1" specimen which correlates to NUKON fines at 1/8" strainer

size, Temp-Mat, Rockwool, and NUKON fines at 3/32" strainer size respectively. The sample extraction was logged on sample control logs noted per Attachment B, page B-4.

Each sample group was mounted on carbon tape and then mounted onto a penny to be put in the FE-SEM holder. They were also sputter coated with a ~20 nm thick platinum coating that is required for using a FE-SEM. The MRS was inserted into the FE-SEM holder with the samples for measurement calibration purposes. Sample holder x-y positioning is controlled by software that is configured for the type of sample holder installed.

4.2.3- FE-SEM Instrument

The FE-SEM instrumentation at UNL was powered up by Alion contracted personnel in accordance with the process noted in the Alion SEM Examination Procedure (2). This procedure is provided in QA files in order to establish imaging capability (i.e. to ensure electron lens focusing and preventing astigmatism). The instrument was operated at a vacuum condition that does not cause charging of the sample (Attachment A). Double sided carbon tape was applied to each stub to minimize charging.

The scale bar depicted on FE-SEM images is generated from the instrument, and cannot be used for analysis because it is not QA certified. To conduct an accurate analysis of fiber length, the QA certified MRS was scanned to verify the serial number and grid pitch dimensions. Figure 8.2.1.3 shows the MRS grid pattern that was utilized.

The MRS grid pattern itself is accurate to within +/- 0.104 µm for the 50 µm pitch pattern, thus, providing a high level of accuracy in measurements. Information regarding the MRS accuracy and certifications are provided in the Geller Micro analytical Laboratory Resource Guide (3).

All image digital files collected were documented with a unique ID number for traceability. The ID number for each image is provided on a form which also includes the image file name and relevant information regarding date, magnification for the scan, voltage and working distance of the electron beam. See Attachment C for the logs used to record this information.

Image files were collected at various magnifications as noted in the Alion SEM Examination Procedure (2). The images were collected in order of sample location on the carbon tape. Figure 8.2.1.4 thru Figure 8.2.1.63 are the actual raw images from FE-SEM imaging of the samples. The 50 µm pitch pattern was used to analyze the 50X and 25Xmagnification images.

5- Calibration Process

The digital images collected on the MRS, noted as Figure 8.2.1.3, were subjected to a measurement process such that each bar on the calibration grid is a direct write semiconductor pattern which is anti-reflective chromium over quartz at a known width of 25 µm +/- 0.052 µm (Attachment E). The MRS is also certified to be accurate to within +/- 0.104 µm for the 50 µm pitch pattern (Attachment E). Figure 8.2.1.2 provides a view of the 50 µm grid that is used for FE-SEM scale bar calibration at 25X magnification, and Figure 8.2.1.3 provides a view of the 50 µm grid that is used for FE-SEM scale bar calibration at 50X magnification. The 50 µm grid is also shown in Figure 4 of Geller Micro analytical Resource Guide (3). Hence, the Figure 8.2.1.3 collected on the FE-SEM instrument matches Figure 4 of

the Geller Micro analytical Laboratory Resource Guide (3). A verification of the serial number was also performed and is shown in Figure 8.2.1.1.

The MRS-3XY is coated with a proprietary material which allows for image observation at any accelerating voltage. Using pitch measurements cancel edge to edge locations as long as like positions are measured. This removes error from measurement of a single line or a space width because illumination can cause edge effects to lead to uncertainty in the edge locations.

5.1- Scanning Electron Microscopy

A digital pixel process method was utilized to measure the number of pixels from a digital image created by the FE-SEM and convert them to a length in micrometers. Utilizing the MRS images from FE-SEM, measurements were made of the pitch patterns, and then converted to pixel lengths (see Figure 8.2.2.1 and Figure 8.2.2.2).

Commercial software (GIMP) was utilized to determine the number of pixels within the lengths of fiber from the FE-SEM images. From a magnified sample of a fiber image, the number of pixels was manually counted and compared to the reported pixel quantity. Agreement between the manual pixel count and the quantity reported by the software was established to be +/- 1 pixel (accounting for partial pixels). This allowed for the digital examination and categorization of the fiber length samples as the slide images were taken at difference magnifications. This process was repeated for each magnification.

Pixel length measurements of the two MRS pitch patterns were taken, and an average ratio of the known grid length to pixel count was calculated to determine the actual length of each pixel at 50X and 25X magnification. The results are displayed in Figure 5.1.1 and Figure 5.1.2. Copies of the original, unaltered images are located in Section 8.2.1.

It is noted that the grid has observable abrasions. However, the limits of the overlaying segments can be observed such that the scaled lengths can be determined.

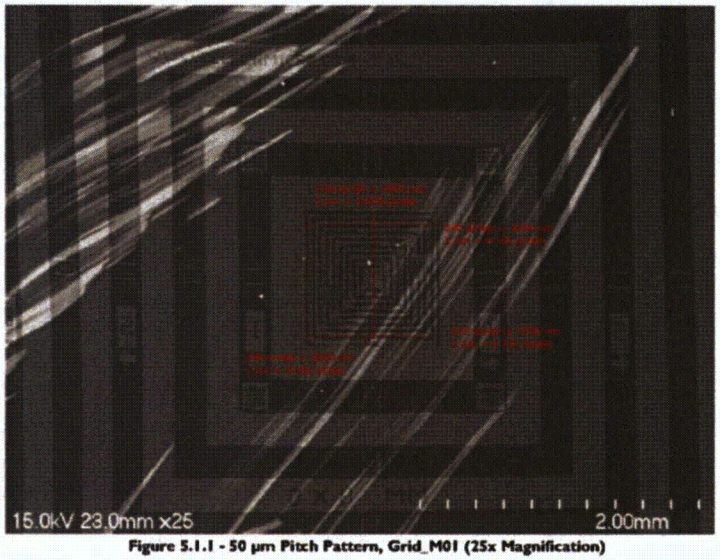

Figure 5.1.1 - 50 µm Pitch Pattern, Grid_M01 (25x Magnification)

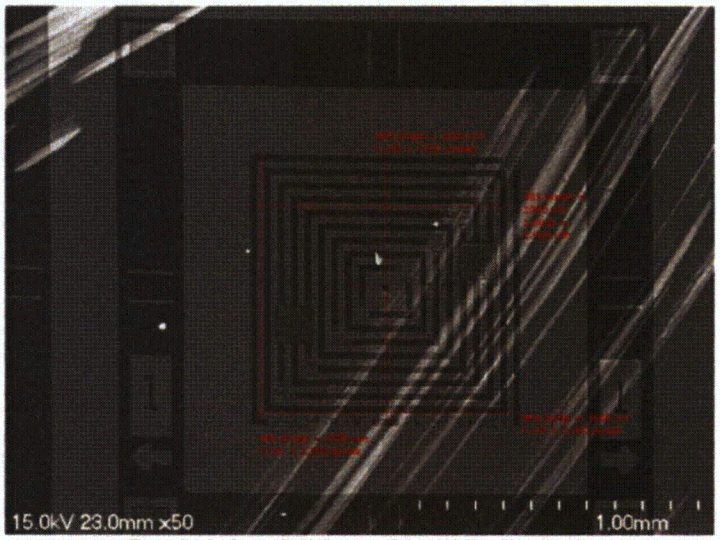

Figure 5.1.2 - 50 µm Pitch Pattern, Grid_M01 (50x Magnification)

Table 5.1.1 shows how the conversion factor was calculated between pixels and length. Lines of a manually counted pixel length were drawn over a known distance on the MRS. By dividing the known distance by the number of pixels required to span that length, the length per pixel was determined.

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Table 5.1.1 - MRS-3XY Grid Length Comparison Summary

Grid	Mag. Factor	Length 1 (pixels)	Known Length 1 (µm)	Length 2 (pixels)	Known Length 2 (µm)	Length 3 (pixels)	Known Length 3 (µm)	Length 4 (pixels)	Known Length 4 (µm)	Average Measured Pixel Length (µm)
Grid-25x_m01	25X	246	1000	244	1000	242	1000	242	1000	4.1068
Grid-50x_m02	50X	485	1000	485	1000	492	1000	490	1000	2.0492

6- Measurements

6.1- FE-SEM Measurements

In order to perform fiber measurements, various images were taken at different magnifications on the FE-SEM instrument. Measurements were made utilizing the GNU Image Manipulation Program (GIMP 2.6.11). This program allowed for lines to be drawn over the selected fibers with a pixel count displayed. A manual count of the pixels was performed periodically for each sample image to ensure the measurements made by the GIMP were correct. All direct data measurement sheets are located in Attachment D.

Ten sample fiber lengths were examined from each FE-SEM image, for a total of 600 fiber lengths examined. Measurements were made of whole fibers, provided that both ends of each analyzed fiber could be easily discerned. If the fiber went off the page or the end was otherwise indiscernible, it was assumed to be the maximum length of >2500 µm. Of the 600 sampled fibers, there were 4 of 15 from NUKON 1/8", 6 of 62 from Temp-Mat, 1 of 17 from Rockwool, and 7 of 27 from NUKON 3/32" that measured >2500 µm in length before going off the page or the end of the fiber lost, and 11 of 15 from NUKON 1/8", 56 of 62 from Temp-Mat, 16 of 17 from Rockwool, and 20 of 27 from NUKON 3/32" fibers measured <2500 µm in length before going off the page or the end of the fiber lost. These fibers <2500 µm in length before going off the page or the end of the fiber lost were assumed to be >2500 µm in length. Utilizing the MRS images, the relationship between the lengths of a single pixel to micrometer length was determined. The establishment of this relationship allowed the length of the sample fiber lengths identified in the FE-SEM images to be determined. Table 6.1.1 and Table 6.1.2 show the results of the visible fiber length measurements from the FE-SEM images.

Table 6.1.1 - FE-SEM Visible Fiber Length Size Distribution Percentages

Fibers longer than:	NUKON 1/8"	%	Temp-Mat	%	Rockwool	%	NUKON 3/32"	%	Total	%
0 µm	150	100	150	100	150	100	150	100	600	100
500 µm	128	85	146	97	100	67	116	77	490	82
1000 µm	77	51	107	71	38	25	77	51	299	50
1500 µm	21	14	49	33	13	9	34	23	117	20
2000 µm	11	7	24	16	3	2	12	8	50	8
2500 µm	17	11	67	45	17	11	28	19	129	22

Table 6.1.2 - FE-SEM Fiber Length Measurements

	NUKON 1/8"	Temp-Mat	Rockwool	NUKON 3/32"	Total
Minimum Length (µm)	130.9	318.9	133.6	66.8	162.55
Maximum Length (µm)	3904.3	4655.5	5697	3881.2	4534.5
Average Fiber Length (µm)	1126.1	1589.3	853.7	1135.8	1176.2
Number of Measurements	150	150	150	150	600

The analysis involved taking measurements of random fibers within the image to get a distribution of lengths. Attempts were made to capture fibers with both ends visible, however a number of fibers can extend beyond the edge of the image or either or both ends indistinguishable. It can be assumed that any fibers continuing past the image edge or the end indistinguishable from the other fibers are >2500µm in length.

The average fiber diameter of NUKON 1/8" was found to be 7.650 µm, Temp-Mat was found to be 8.641 µm, Rockwool was found to be 5.715 µm, and NUKON 3/32" was found to be 7.275 µm. This diameter was found by measuring three cross section measurements on two fibers in the first image of each sample set, for a total of 72 measurements, as shown in Table 6.1.3. The diameter analysis was conducted in a similar manner to the fiber lengths analysis, i.e., comparing pixels to a known length.

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Table 6.1.3 – Fiber Diameter Analysis

	Fiber #	Fiber Diameter 1 (Pixels)	Fiber Diameter 2 (Pixels)	Fiber Diameter 3 (Pixels)	Average Diameter (pixels)	Grid Adjusted Avg. Diameter (µm)	Average Diameter per Test
C1_m01	1	4.2	3.6	4.1	4.0	8.128	
	5	4.2	4.5	4.5	4.4	9.016	
C2_m01	1	5.0	5.0	4.5	4.8	9.904	7.650 µm
	5	3.2	3.2	3.6	3.3	6.831	
C3_m01	1	3.2	2.2	2.2	2.5	5.191	
	5	4.0	3.0	3.0	3.3	6.831	
D1_m01	1	5.0	5.0	5.0	5.0	10.246	
	5	5.0	3.6	3.6	4.1	8.333	
D2_m01	1	5.8	5.8	5.8	5.8	11.885	8.641 µm
	5	3.6	2.8	3.6	3.3	6.831	
D3_m01	1	3.6	3.6	4.5	3.9	7.992	
	5	3.2	3.2	3.2	3.2	6.557	
R1_m01	1	2.2	2.2	2.2	2.2	4.508	
	5	3.6	2.8	2.2	2.9	5.874	
R2_m01	1	3.6	3.6	4.0	3.7	7.650	5.715 µm
	5	2.8	2.8	2.8	2.8	5.738	
R3_m01	1	3.2	2.0	2.0	2.4	4.918	
	5	2.2	3.2	2.8	2.7	5.601	
S1_m01	1	4.5	4.1	4.1	4.2	8.675	
	5	2.2	3.0	3.2	2.8	5.738	
S2_m01	1	4.0	4.0	4.0	4.0	8.197	7.275 µm
	5	5	3.6	4.5	4.4	8.948	
S3_m01	1	2.2	2.2	2.2	2.2	4.508	
	5	3.6	3.9	3.6	3.7	7.582	
				Average Diameter (µm)	7.320	1 pixel =	2.049 µm

7- Conclusions

Based on the results of the FE-SEM measurements, it can be concluded that the majority of fibers trapped in the bypass filter bags are less than 1500 microns in length. The predominant visible fiber length sizes are provided in Table 6.1.1 and Table 6.1.2. It can be seen from Table 6.1.2 that the smallest fiber measured was about 66.8 microns. Overall, based on the results shown in Table 6.1.1, it is concluded that the fibers in the NUKON 1/8" filter bags have an average of 1126.1 microns, the Temp-Mat have an average of 1589.3 microns, the Rockwool have an average of 853.7 microns, and the NUKON 3/32" have an average of 1135.8 microns. These general fiber lengths allow for a further understanding of bypass fiber characteristics.

8- Images and Photographs

8.1- Macro-Photographs

Figure 8.1.1– NUKON Fiber from 1/8" Strainer Hole Size 5 Micron Filter Bag

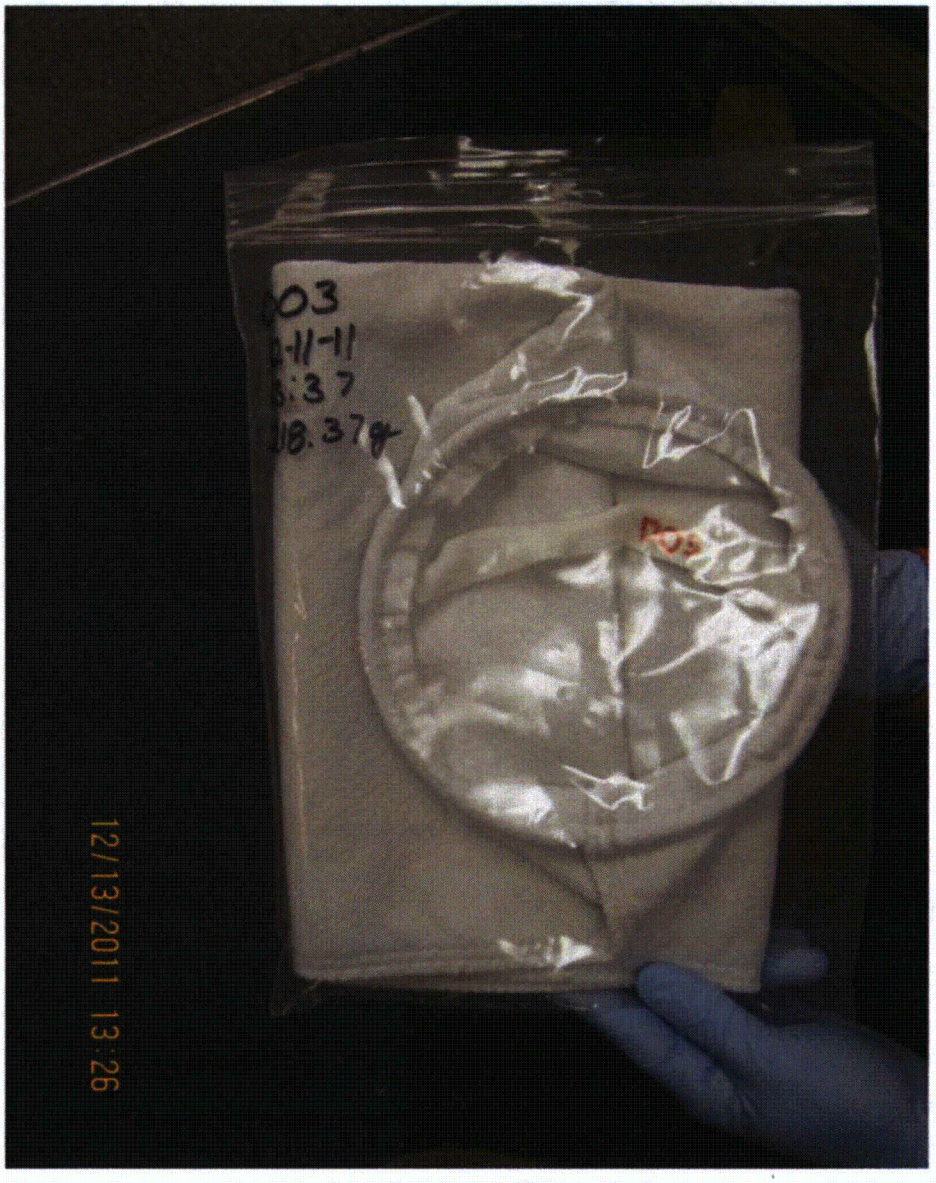

Figure 8.1.2 – Temp-Mat (White) 5 Micron Filter Bag

Figure 8.1.3 – Rockwool 5 Micron Filter Bag

Figure 8.1.4 – NUKON Fines from 3/32" Strainer Hole Size 5 Micron Filter Bag

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Attachment 2 – Material Control Index

MATERIAL CONTROL INDEX

MATERIAL

Sample ID# (N/A for Material):
CSC7, DC3, DI7, SC3

Component Description: insulation Sample

Document	Entered By	Date:
Purchase Order # STP 4322239	JEB	3/21/12
Material Receipt Report BWROG-1	JEB	3/21/12
Calibration/Certification Documentation N/A		
Installation Specification/Description (N/A for Material) N/A		
Post Installation Test Report (N/A for Material) N/A		
Configuration Control Log (Attach to this Index) NA		

Additional Documentation: Photographs
Attached with purchase orders SN
CSC7, DC3, DI7, SC3

Figure 8.1.5 - Mrs-3xy Grid Receipt Inspection

Figure 8.1.6 – C1, C2, and C3 Samples Mounted On Carbon Tape And Penny

Figure 8.1.7 – D1, D2, and D3 Samples Mounted on Carbon Tape and Penny

Figure 8.1.8 – R1, R2, and R3 Samples Mounted On Carbon Tape And Penny

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Figure 8.1.9 – S1, S2, and S3 Samples Mounted On Carbon Tape And Penny

8.2 - FE-SEM Images

8.2.1- Original Images from FE-SEM

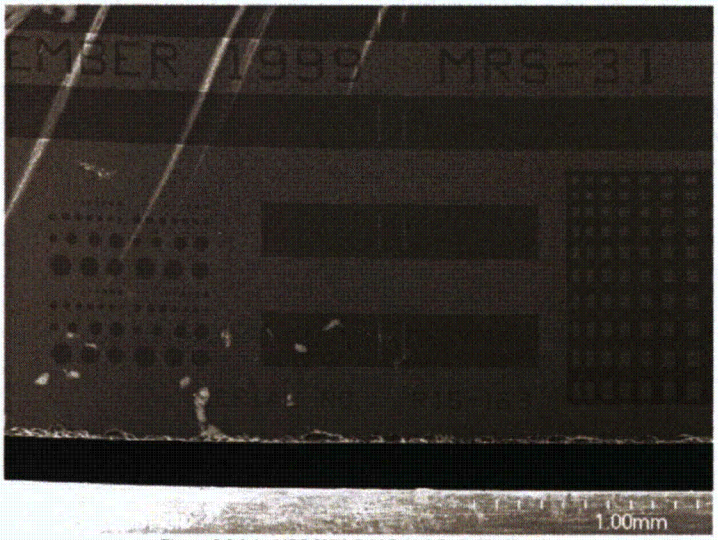

Figure 8.2.1.1 - MRS-3XY Grid Serial Code Verification

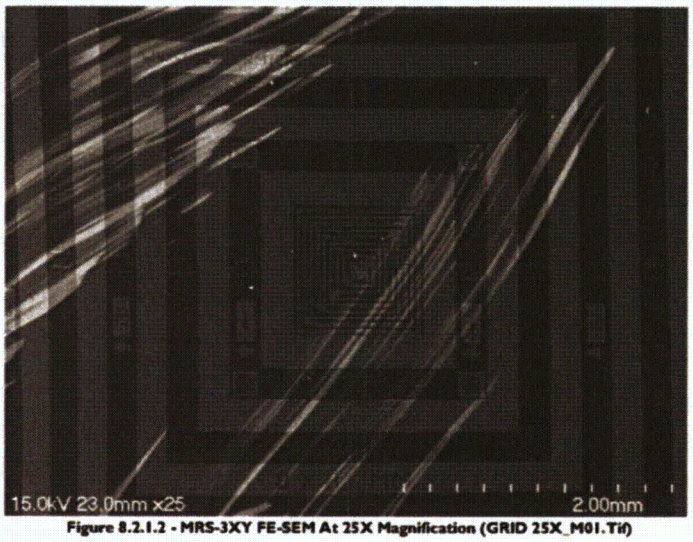

Figure 8.2.1.2 - MRS-3XY FE-SEM At 25X Magnification (GRID 25X_M01.Tif)

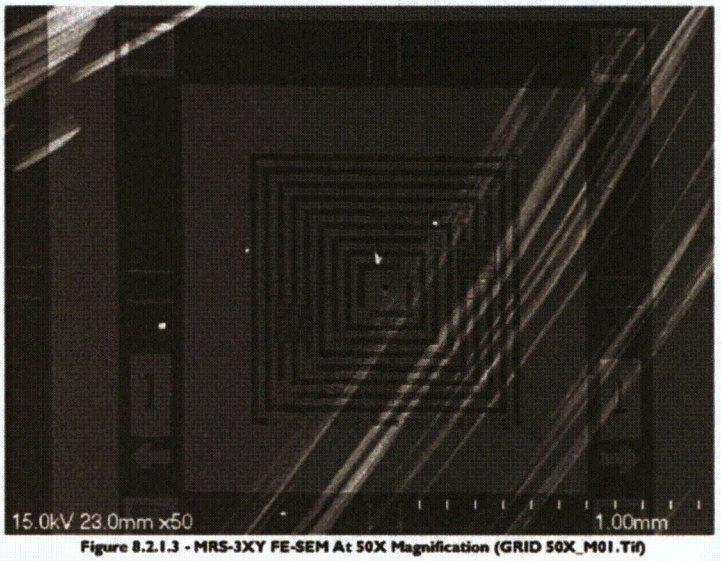

Figure 8.2.1.3 - MRS-3XY FE-SEM At 50X Magnification (GRID 50X_M01.Tif)

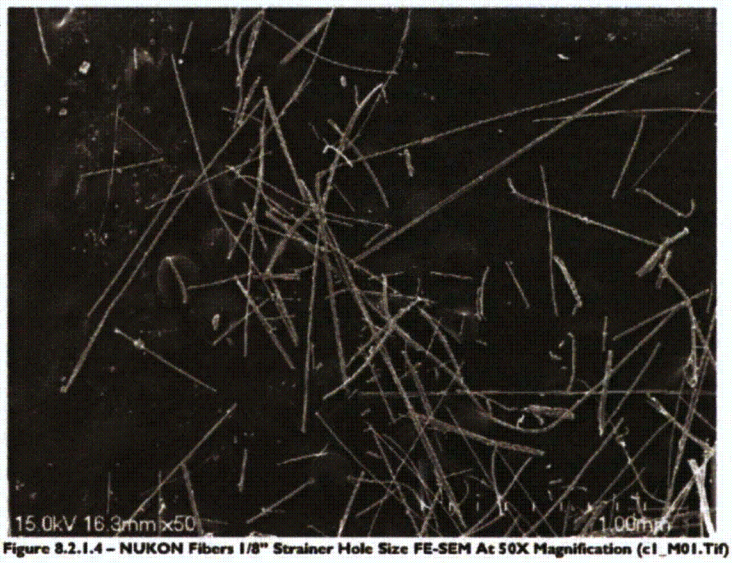

Figure 8.2.1.4 – NUKON Fibers 1/8" Strainer Hole Size FE-SEM At 50X Magnification (c1_M01.Tif)

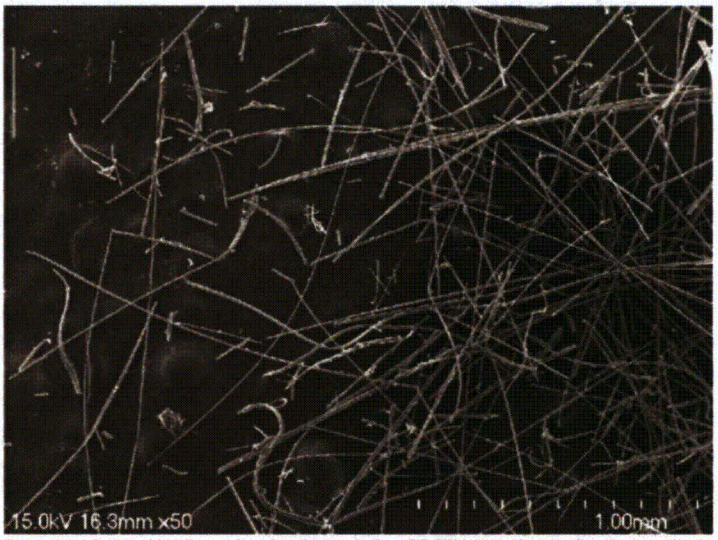

Figure 8.2.1.5 - NUKON Fibers 1/8" Strainer Hole Size FE-SEM At 50X Magnification (c1_M02.Tif)

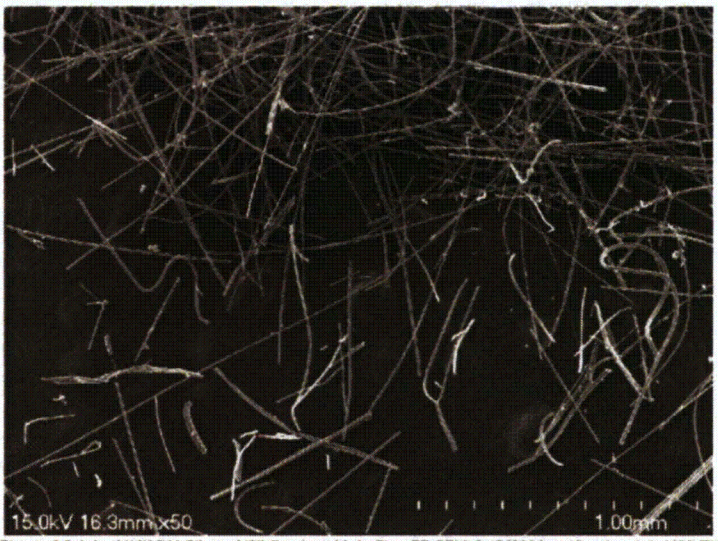

Figure 8.2.1.6 – NUKON Fibers 1/8" Strainer Hole Size FE-SEM At 50X Magnification (c1_M03.Tif)

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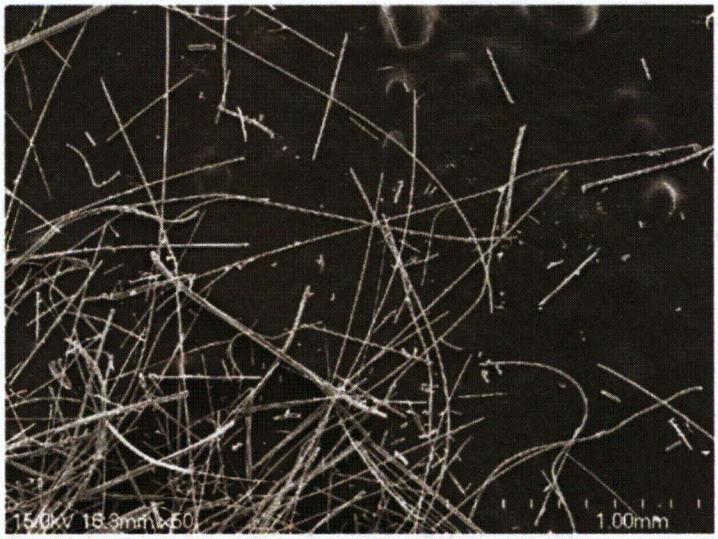

Figure 8.2.1.7 – NUKON Fibers 1/8" Strainer Hole Size FE-SEM At 50X Magnification (c1_M04.Tif)

Figure 8.2.1.8 – NUKON Fibers 1/8" Strainer Hole Size FE-SEM At 25X Magnification (c1_M05.Tif)

Figure 8.2.1.9 – NUKON Fibers 1/8" Strainer Hole Size FE-SEM At 50X Magnification (c2_M01.Tif)

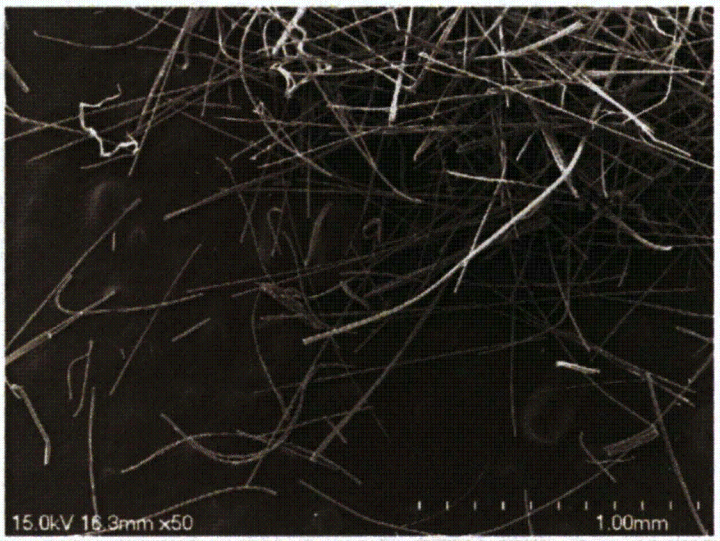

Figure 8.2.1.10 – NUKON Fibers 1/8" Strainer Hole Size FE-SEM At 50X Magnification (c2_M02.Tif)

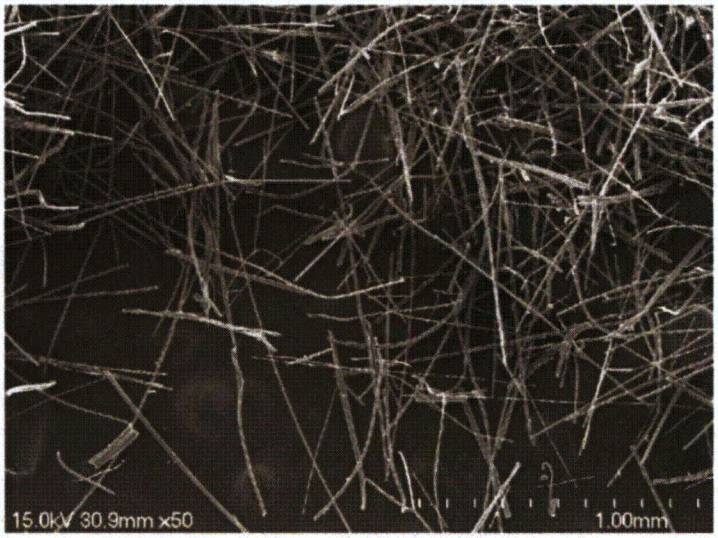

Figure 8.2.1.11 – NUKON Fibers 1/8" Strainer Hole Size FE-SEM At 50X Magnification (c2_M03.Tif)

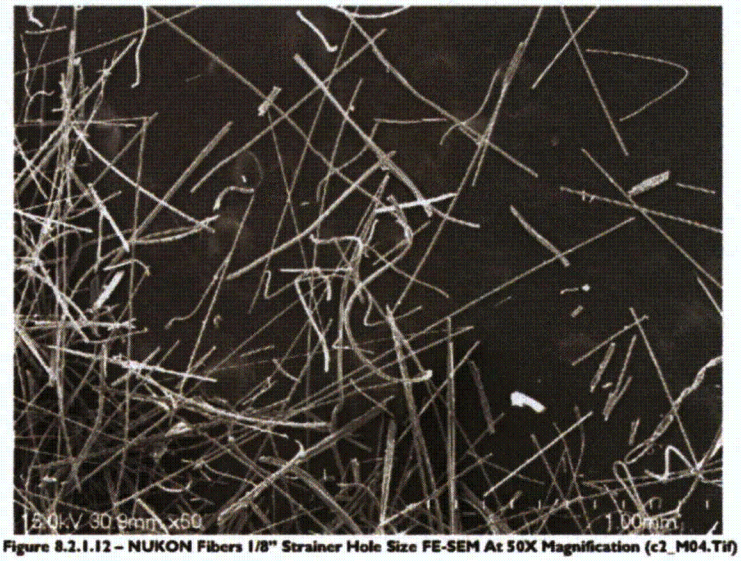

Figure 8.2.1.12 – NUKON Fibers 1/8" Strainer Hole Size FE-SEM At 50X Magnification (c2_M04.Tif)

Figure 8.2.1.13 – NUKON Fibers 1/8" Strainer Hole Size FE-SEM At 25X Magnification (c2_M05.Tif)

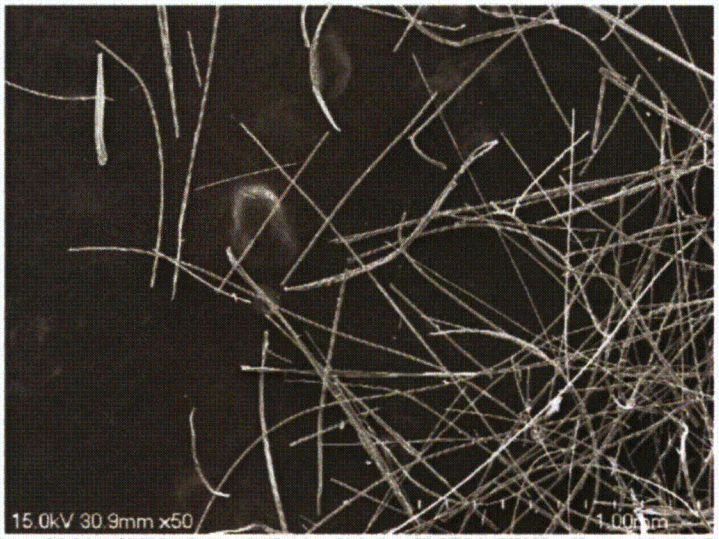

Figure 8.2.1.14 – NUKON Fibers 1/8" Strainer Hole Size FE-SEM At 50X Magnification (c3_M01.Tif)

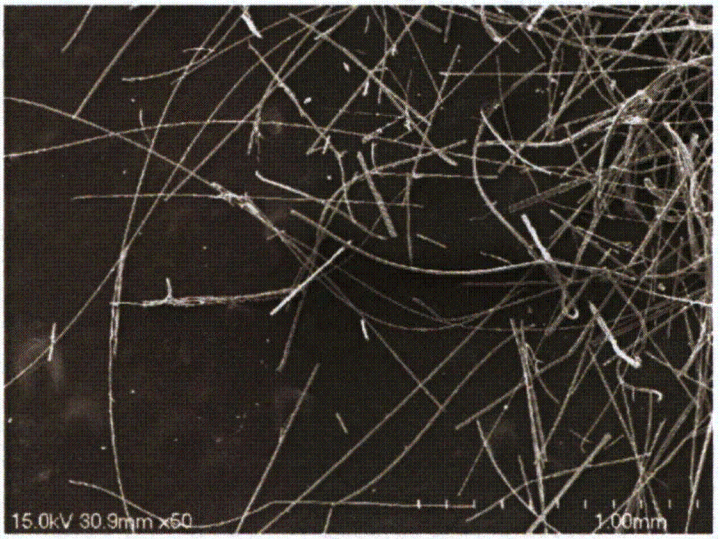

Figure 8.2.1.15 – NUKON Fibers 1/8" Strainer Hole Size FE-SEM At 50X Magnification (c3_M02.Tif)

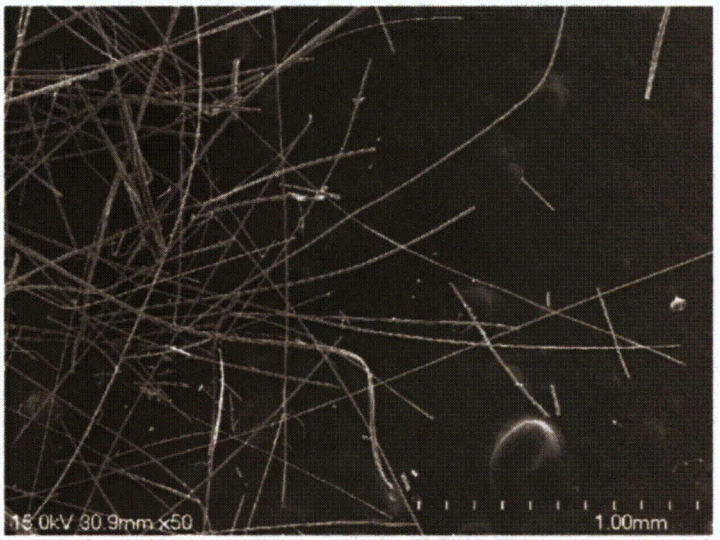

Figure 8.2.1.16 – NUKON Fibers 1/8" Strainer Hole Size FE-SEM At 50X Magnification (c3_M03.Tif)

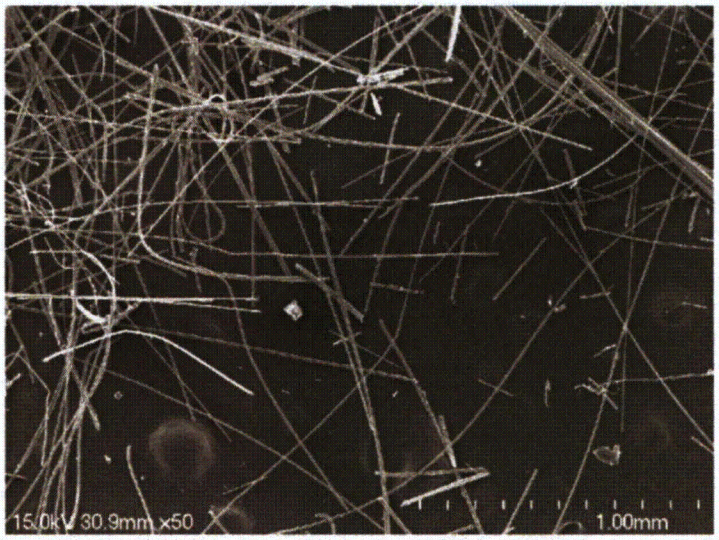

Figure 8.2.1.17 – NUKON Fibers 1/8" Strainer Hole Size FE-SEM At 50X Magnification (c3_M04.Tif)

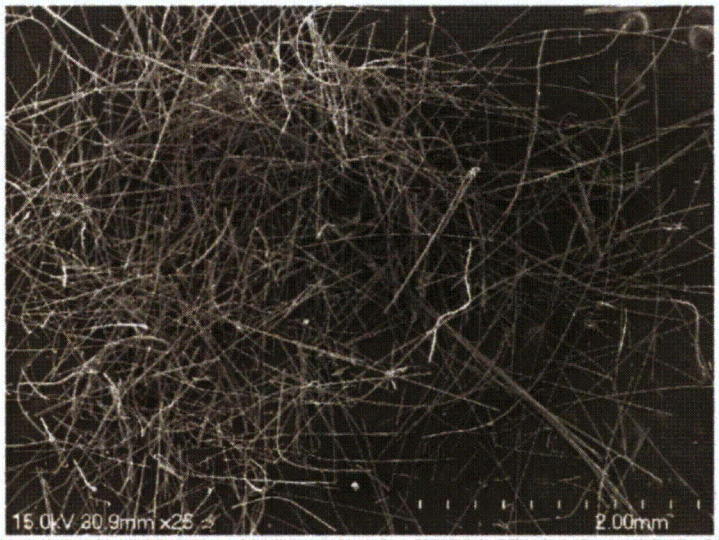

Figure 8.2.1.18 – NUKON Fibers 1/8" Strainer Hole Size FE-SEM At 25X Magnification (c3_M05.Tif)

Figure 8.2.1.19 – Temp-Mat Fibers FE-SEM At 50X Magnification (d1_M01.Tif)

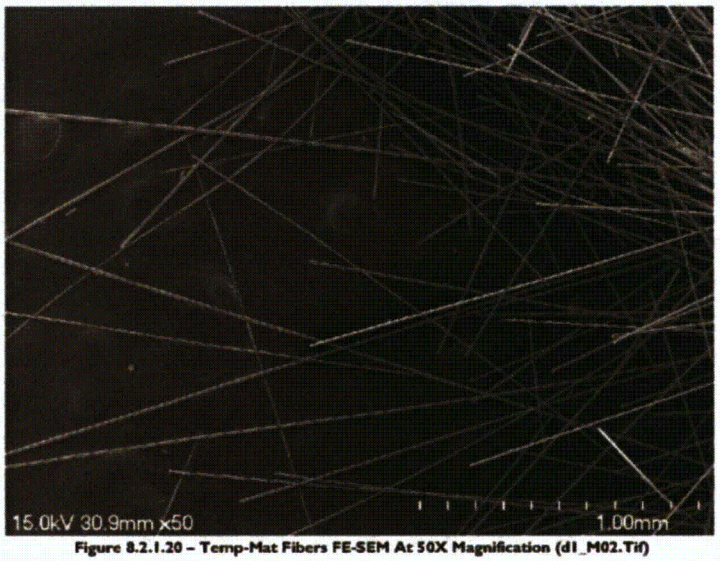

Figure 8.2.1.20 – Temp-Mat Fibers FE-SEM At 50X Magnification (d1_M02.Tif)

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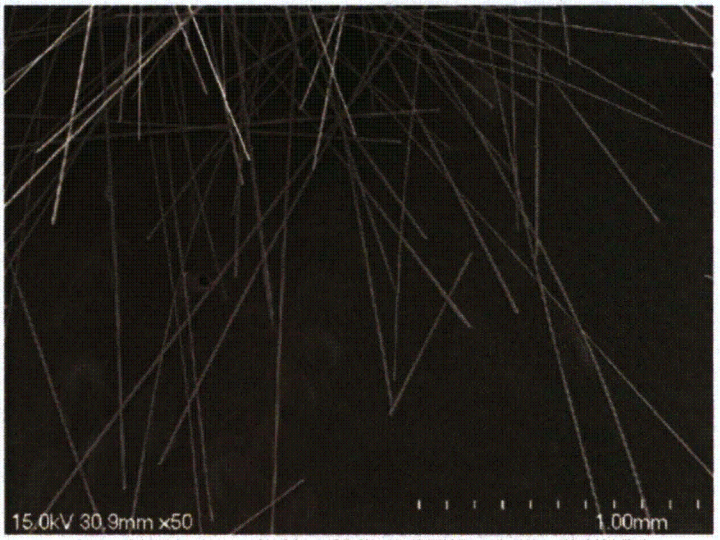

Figure 8.2.1.21 – Temp-Mat Fibers FE-SEM At 50X Magnification (d1_M03.Tif)

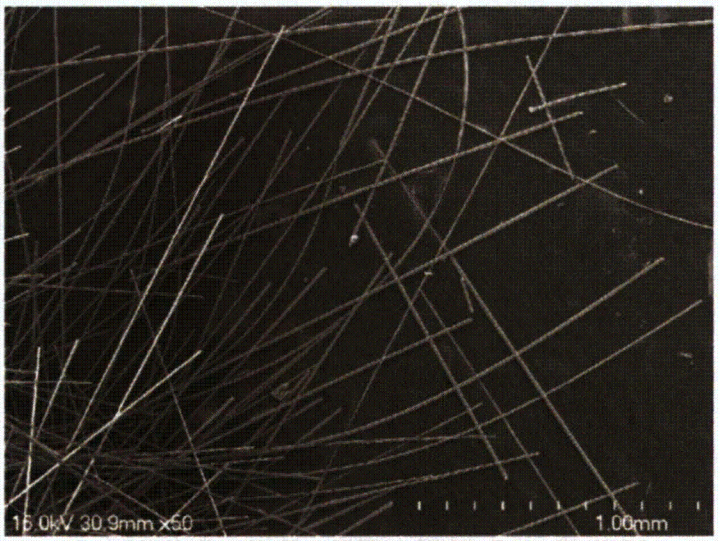

Figure 8.2.1.22 – Temp-Mat Fibers FE-SEM At 50X Magnification (d1_M04.Tif)

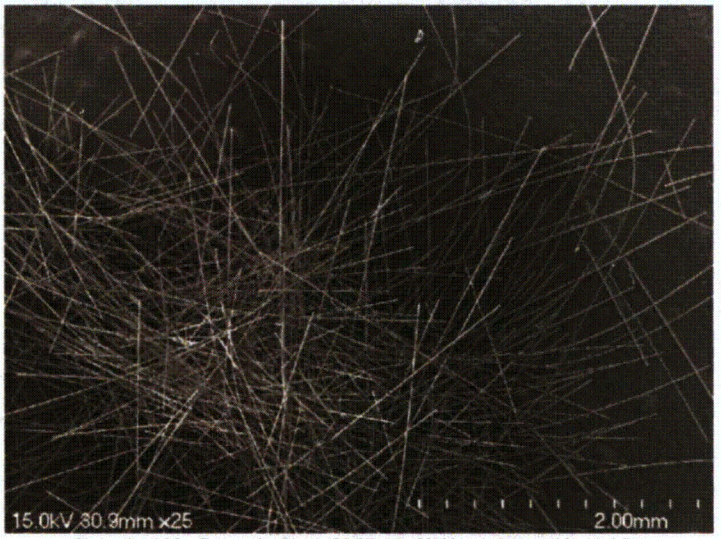

Figure 8.2.1.23 – Temp-Mat Fibers FE-SEM At 25X Magnification (d1_M05.Tif)

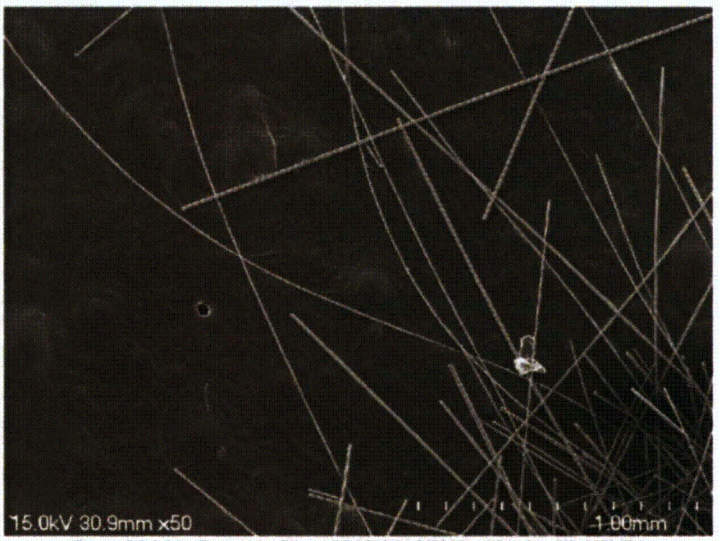

Figure 8.2.1.24 – Temp-Mat Fibers FE-SEM At 50X Magnification (d2_M01.Tif)

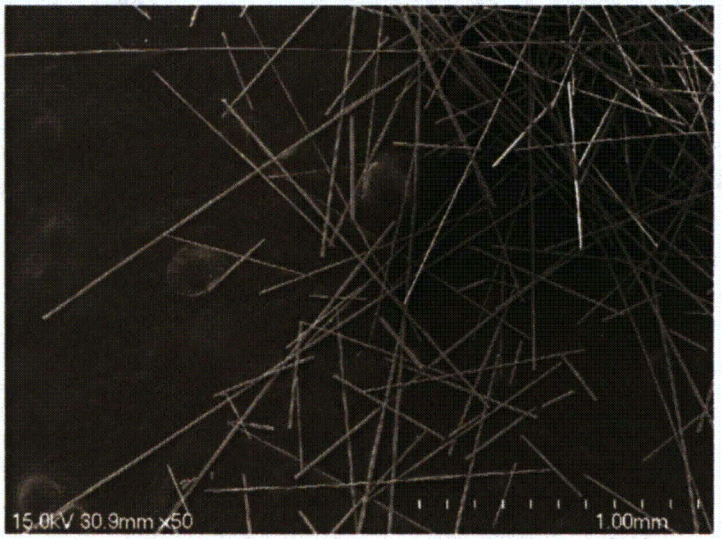

Figure 8.2.1.25 – Temp-Mat Fibers FE-SEM At 50X Magnification (d2_M02.Tif)

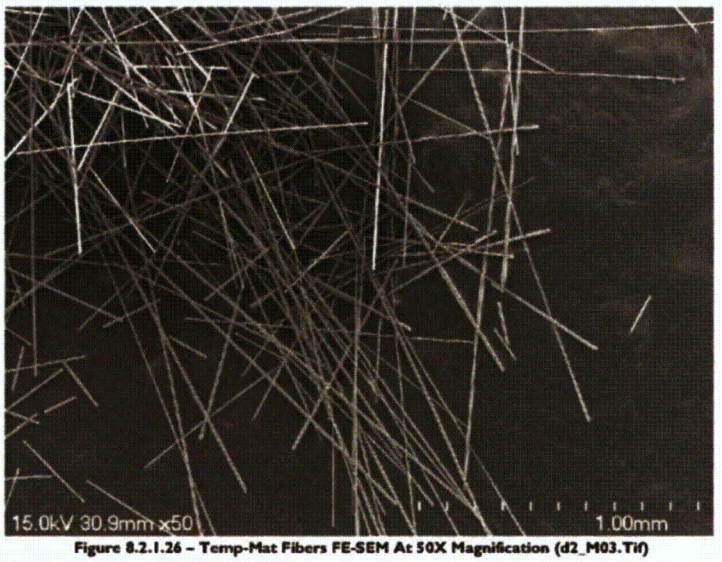

Figure 8.2.1.26 – Temp-Mat Fibers FE-SEM At 50X Magnification (d2_M03.Tif)

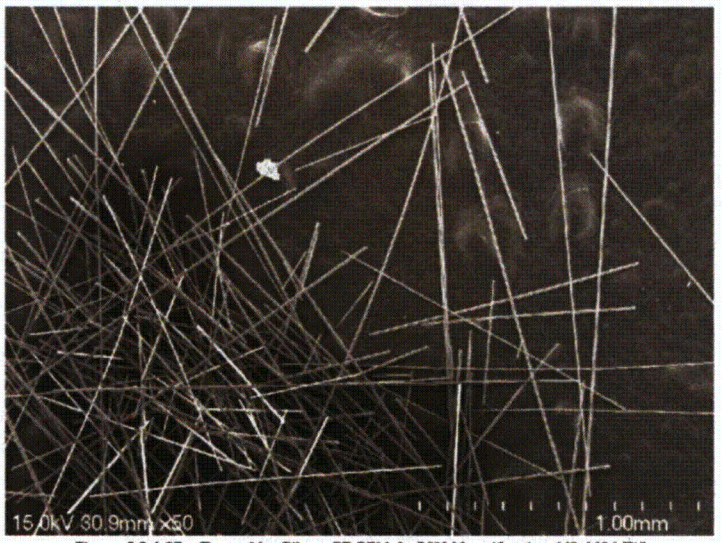

Figure 8.2.1.27 – Temp-Mat Fibers FE-SEM At 50X Magnification (d2_M04.Tif)

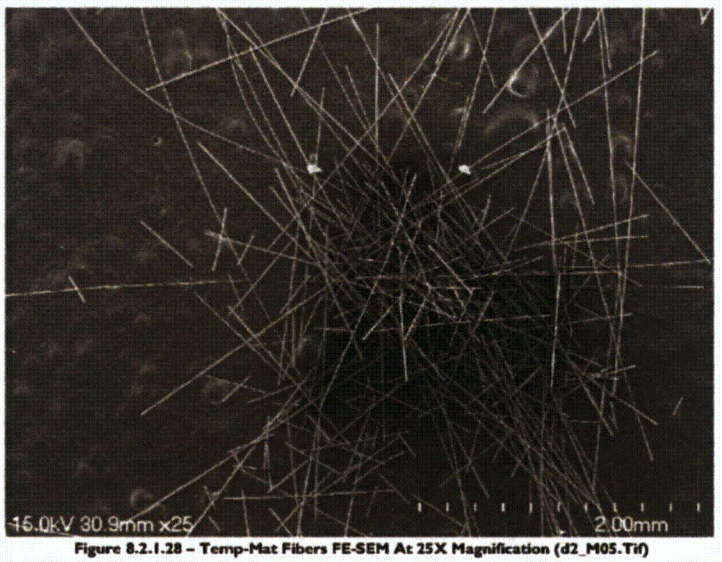

Figure 8.2.1.28 – Temp-Mat Fibers FE-SEM At 25X Magnification (d2_M05.Tif)

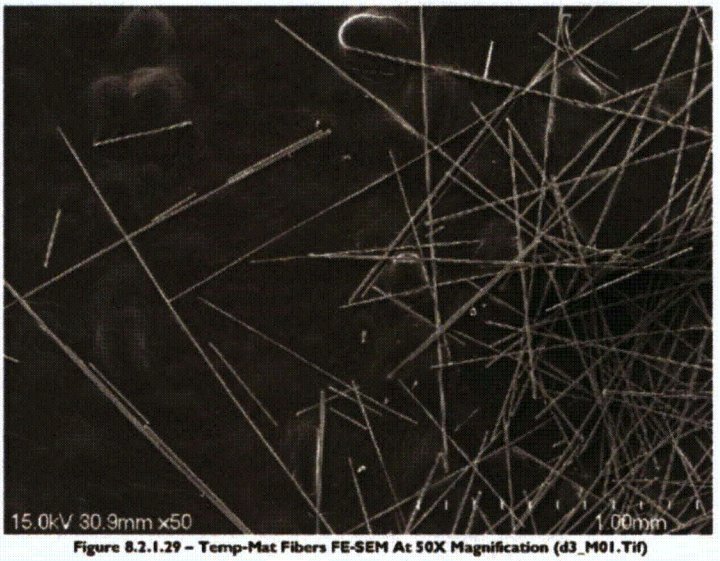

Figure 8.2.1.29 – Temp-Mat Fibers FE-SEM At 50X Magnification (d3_M01.Tif)

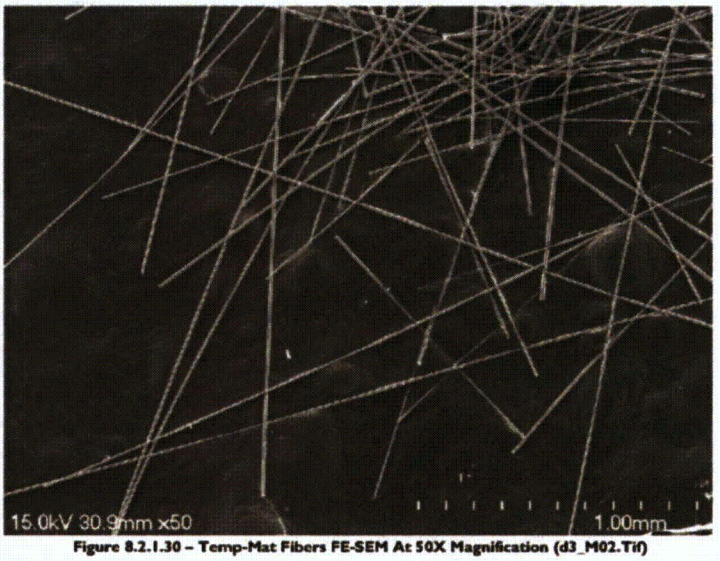

Figure 8.2.1.30 – Temp-Mat Fibers FE-SEM At 50X Magnification (d3_M02.Tif)

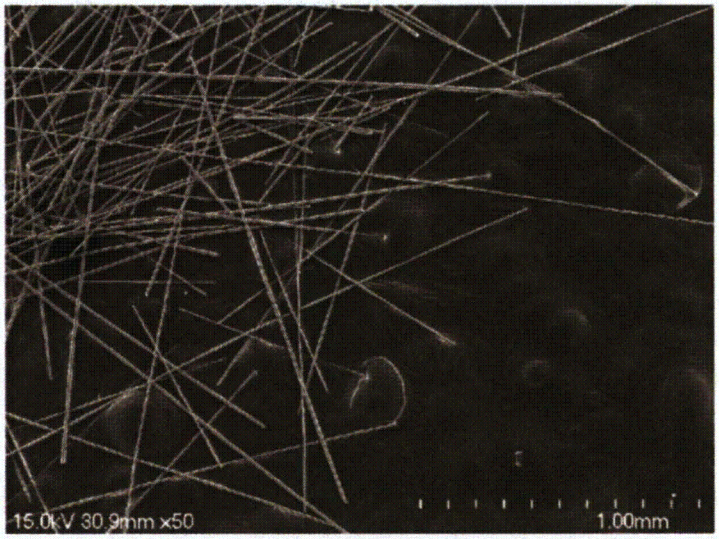

Figure 8.2.1.31 – Temp-Mat Fibers FE-SEM At 50X Magnification (d3_M03.Tif)

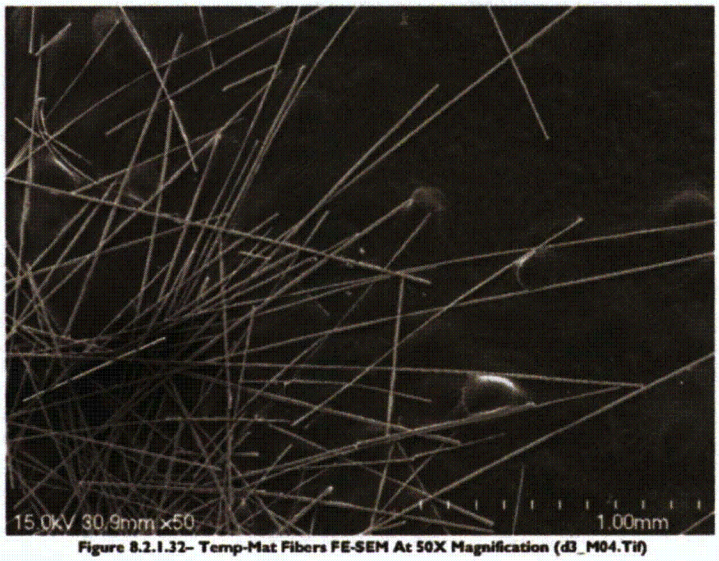

Figure 8.2.1.32– Temp-Mat Fibers FE-SEM At 50X Magnification (d3_M04.Tif)

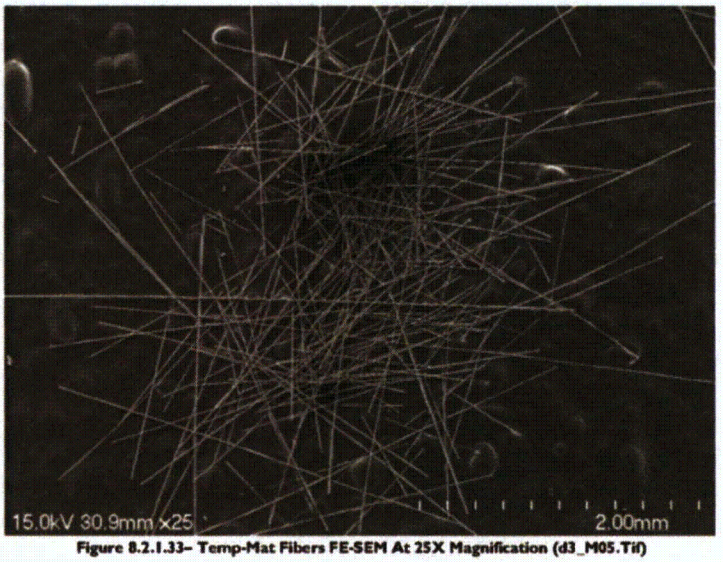

Figure 8.2.1.33– Temp-Mat Fibers FE-SEM At 25X Magnification (d3_M05.Tif)

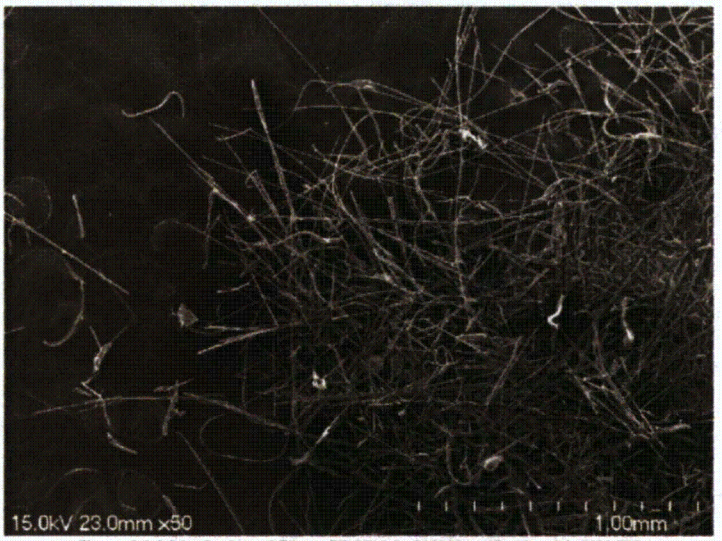

Figure 8.2.1.34 – Rockwool Fibers FE-SEM At 50X Magnification (r1_M01.Tif)

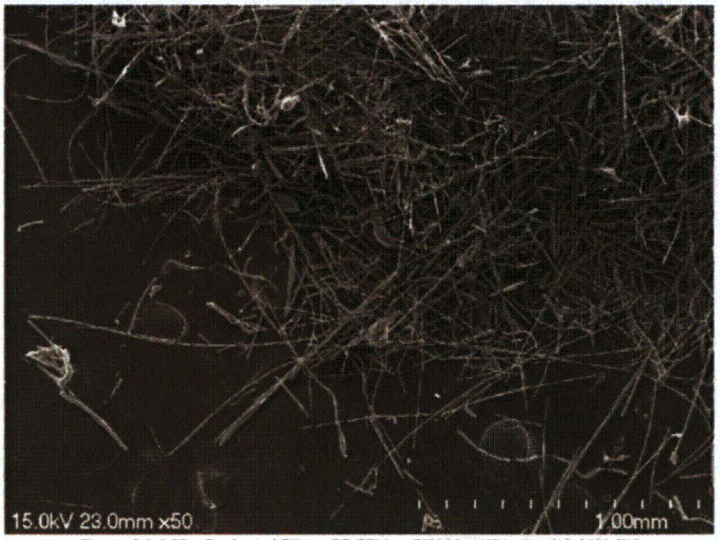

Figure 8.2.1.35 – Rockwool Fibers FE-SEM at 50X Magnification (r1_M02.Tif)

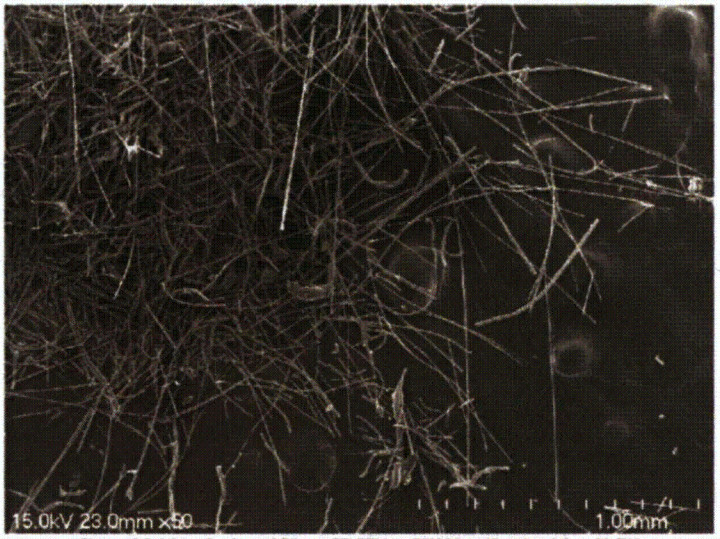

Figure 8.2.1.36 – Rockwool Fibers FE-SEM at 50X Magnification (r1_m03.Tif)

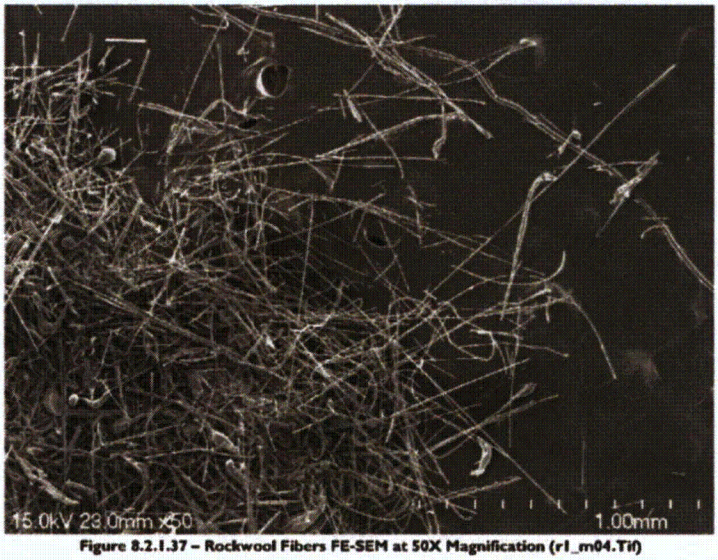

Figure 8.2.1.37 – Rockwool Fibers FE-SEM at 50X Magnification (r1_m04.Tif)

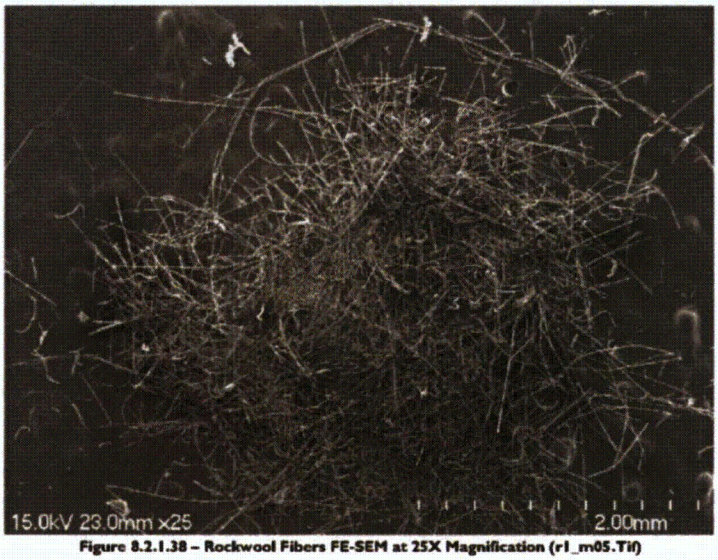

Figure 8.2.1.38 – Rockwool Fibers FE-SEM at 25X Magnification (r1_m05.Tif)

Figure 8.2.1.39 – Rockwool Fibers FE-SEM at 50X Magnification (r2_m01.Tif)

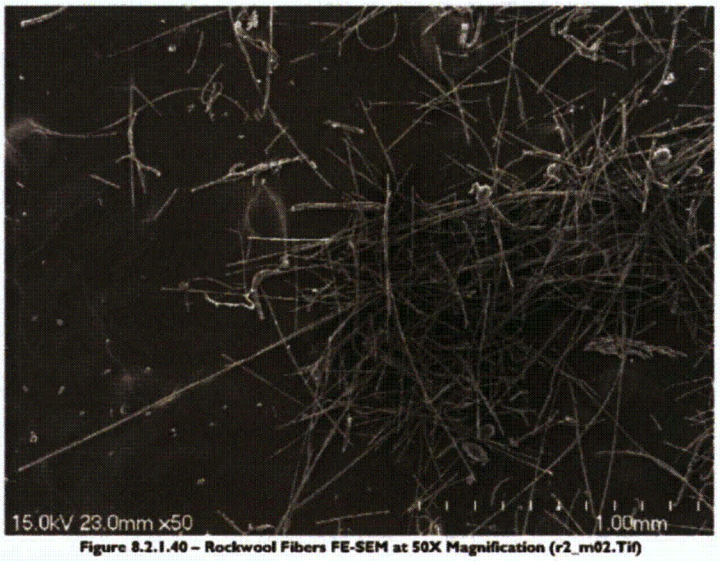

Figure 8.2.1.40 – Rockwool Fibers FE-SEM at 50X Magnification (r2_m02.Tif)

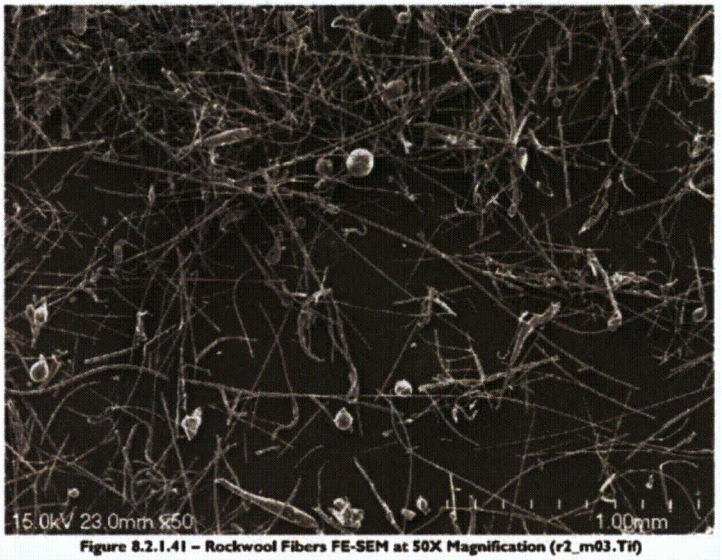

Figure 8.2.1.41 – Rockwool Fibers FE-SEM at 50X Magnification (r2_m03.Tif)

Figure 8.2.1.42 – Rockwool Fibers FE-SEM at 50X Magnification (r2_m04.Tif)

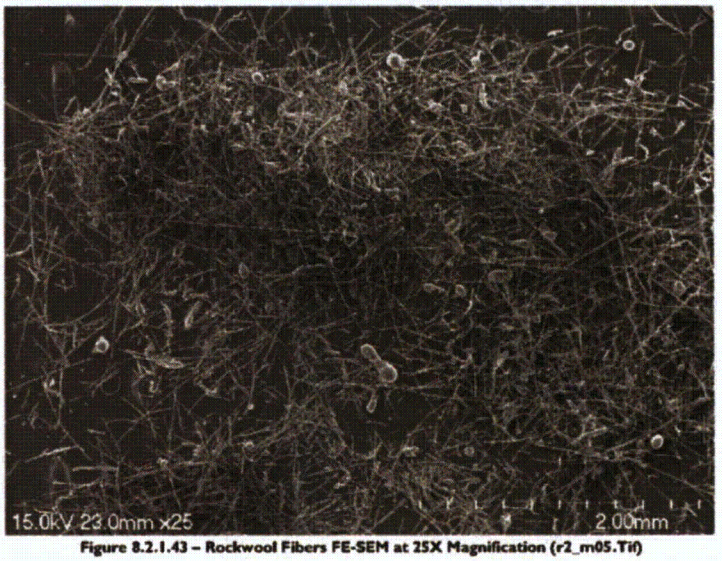

Figure 8.2.1.43 – Rockwool Fibers FE-SEM at 25X Magnification (r2_m05.Tif)

Figure 8.2.1.44 – Rockwool Fibers FE-SEM at 50X Magnification (r3_m01.Tif)

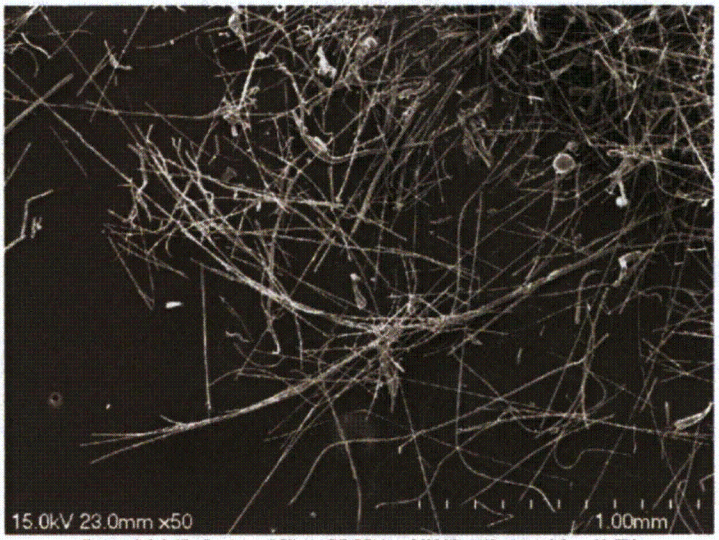

Figure 8.2.1.45– Rockwool Fibers FE-SEM at 50X Magnification (r3_m02.Tif)

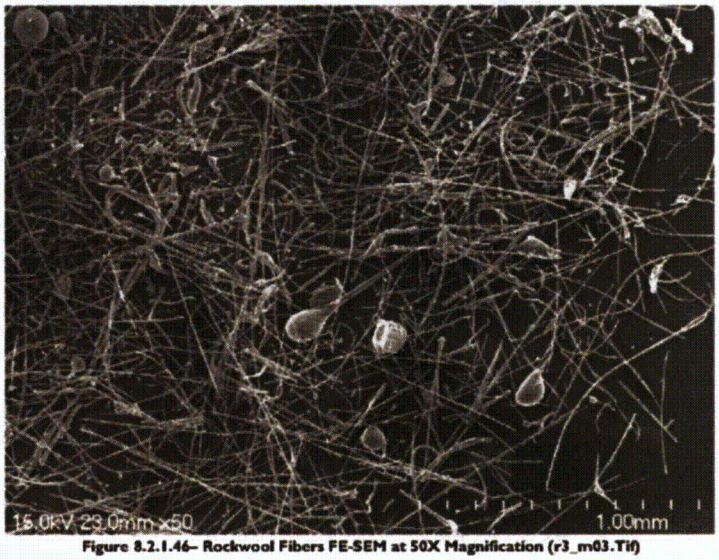

Figure 8.2.1.46– Rockwool Fibers FE-SEM at 50X Magnification (r3_m03.Tif)

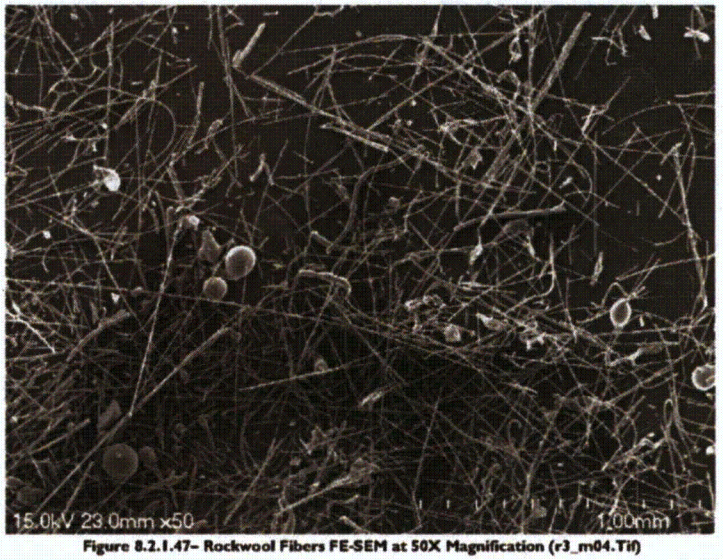

Figure 8.2.1.47– Rockwool Fibers FE-SEM at 50X Magnification (r3_m04.Tif)

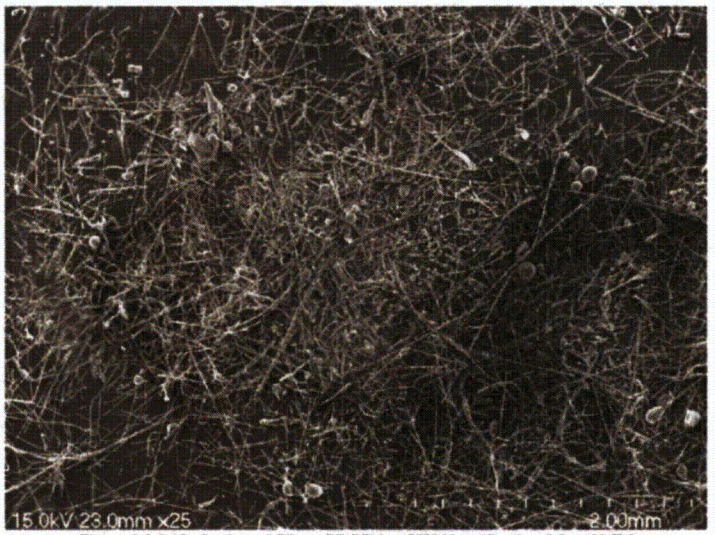

Figure 8.2.1.48– Rockwool Fibers FE-SEM at 25X Magnification (r3_m05.Tif)

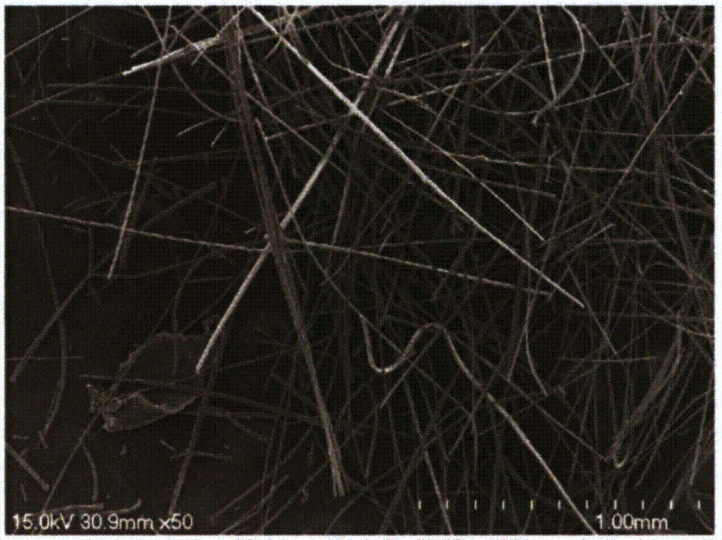

Figure 8.2.1.49– NUKON Fibers 3/32" Strainer Hole Size FE-SEM at 50X Magnification (s1_m01.Tif)

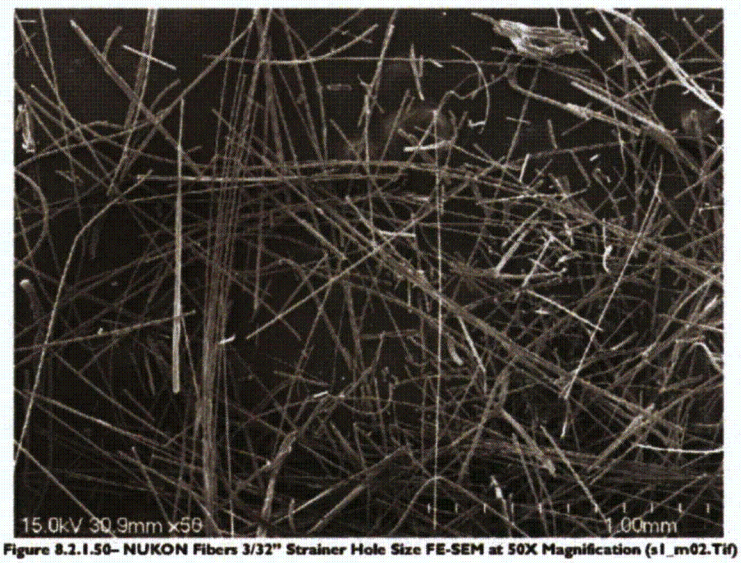

Figure 8.2.1.50– NUKON Fibers 3/32" Strainer Hole Size FE-SEM at 50X Magnification (s1_m02.Tif)

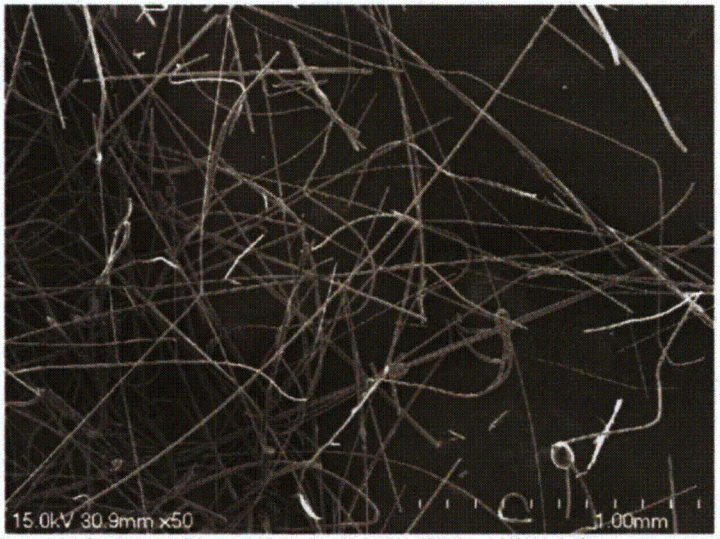

Figure 8.2.1.51– NUKON Fibers 3/32" Strainer Hole Size FE-SEM at 50X Magnification (s1_m03.Tif)

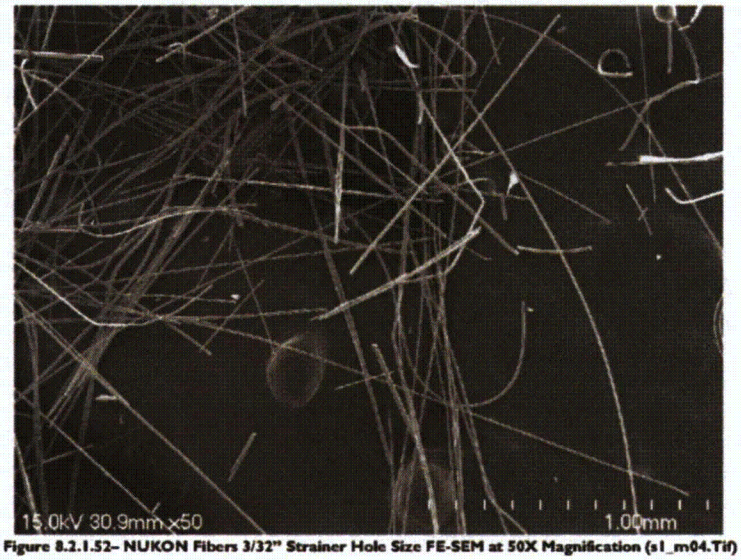

Figure 8.2.1.52– NUKON Fibers 3/32" Strainer Hole Size FE-SEM at 50X Magnification (s1_m04.Tif)

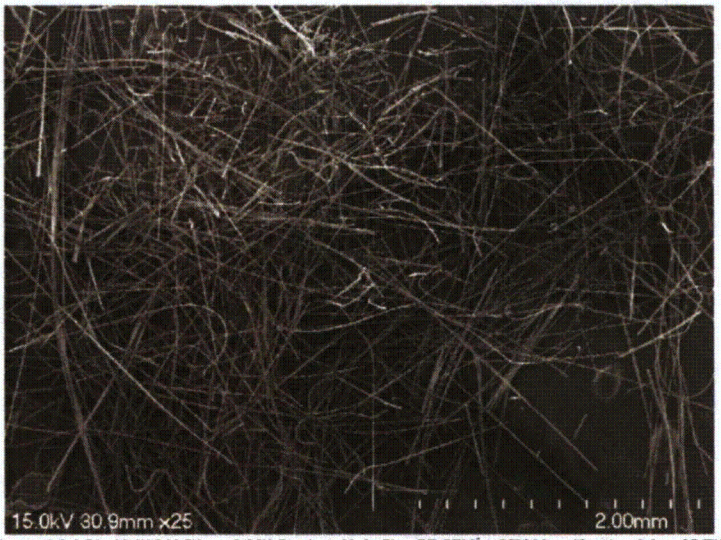

Figure 8.2.1.53– NUKON Fibers 3/32" Strainer Hole Size FE-SEM at 25X Magnification (s1_m05.Tif)

Figure 8.2.1.54– NUKON Fibers 3/32" Strainer Hole Size FE-SEM at 50X Magnification (s2_m01.Tif)

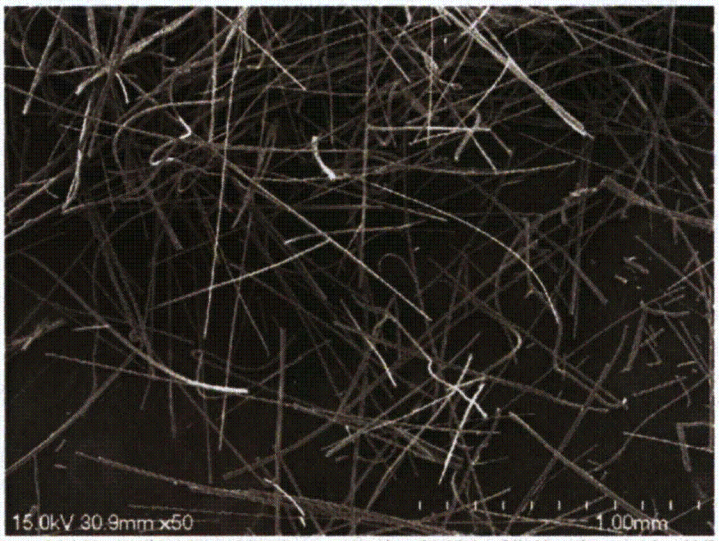

Figure 8.2.1.55 – NUKON Fibers 3/32" Strainer Hole Size FE-SEM at 50X Magnification (s2_m02.Tif)

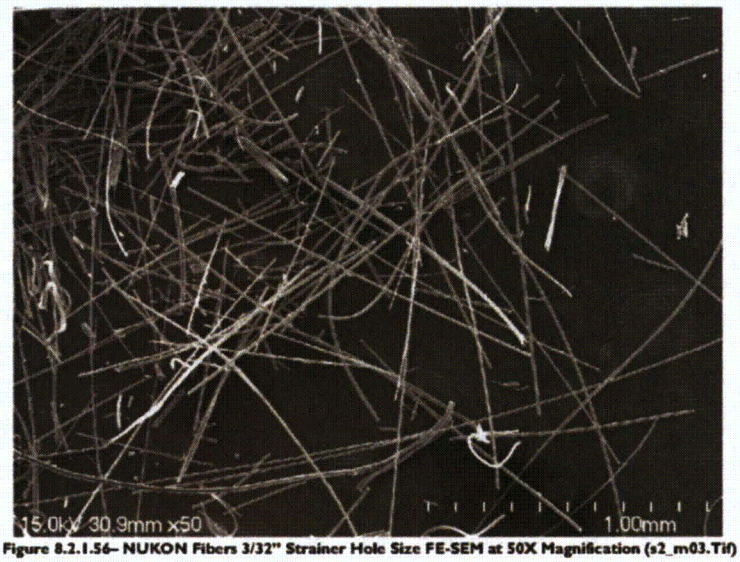

Figure 8.2.1.56– NUKON Fibers 3/32" Strainer Hole Size FE-SEM at 50X Magnification (s2_m03.Tif)

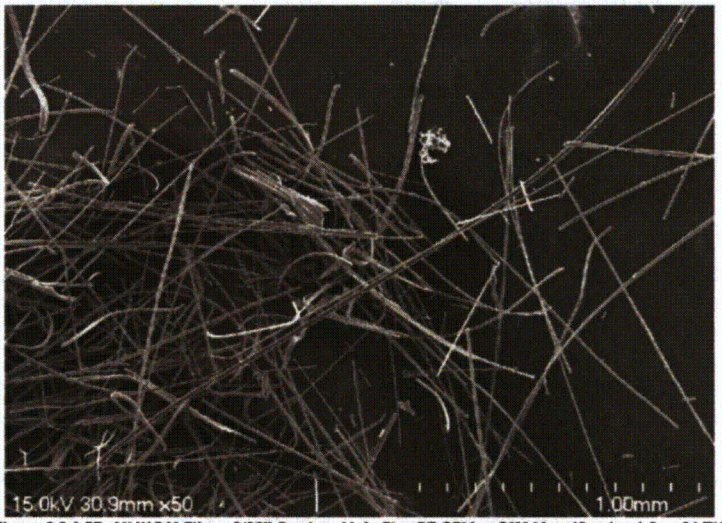

Figure 8.2.1.57– NUKON Fibers 3/32" Strainer Hole Size FE-SEM at 50X Magnification (s2_m04.Tif)

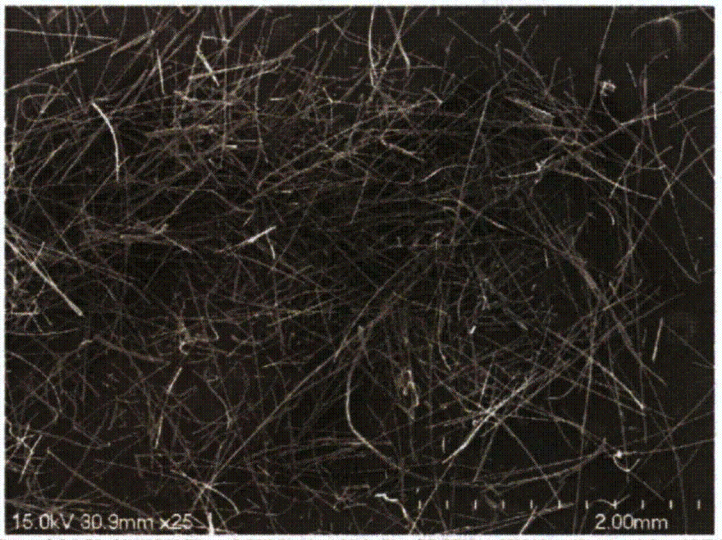

Figure 8.2.1.58– NUKON Fibers 3/32" Strainer Hole Size FE-SEM at 25X Magnification (s2_m05.Tif)

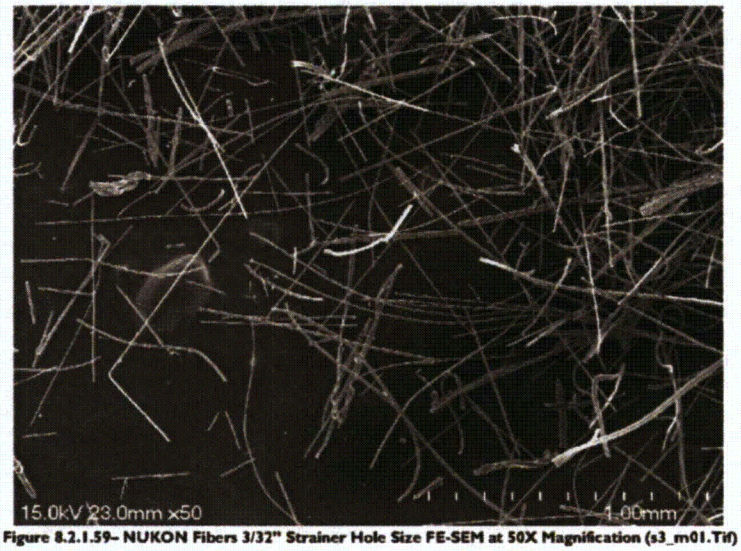

Figure 8.2.1.59– NUKON Fibers 3/32" Strainer Hole Size FE-SEM at 50X Magnification (s3_m01.Tif)

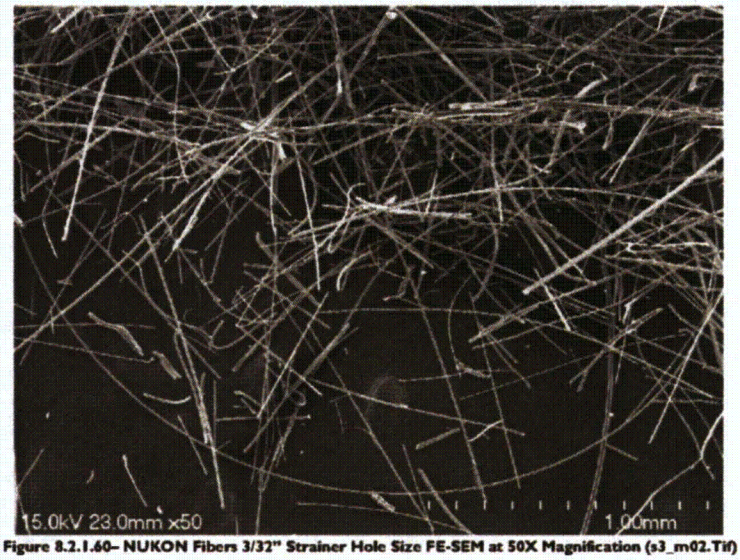

Figure 8.2.1.60– NUKON Fibers 3/32" Strainer Hole Size FE-SEM at 50X Magnification (s3_m02.Tif)

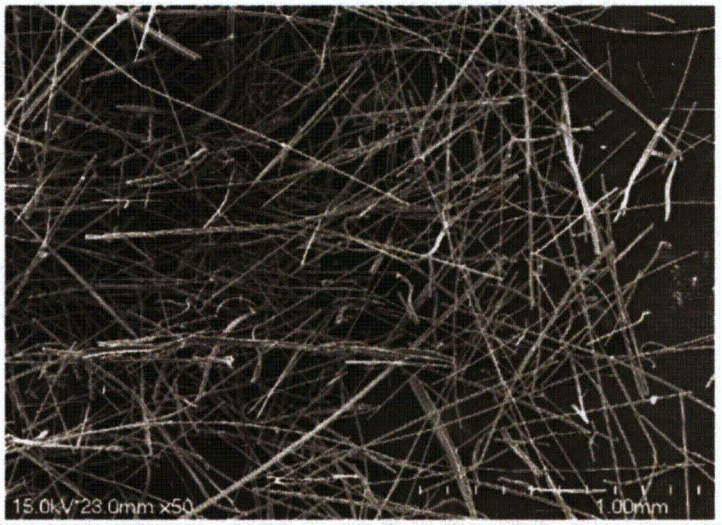

Figure 8.2.1.61– NUKON Fibers 3/32" Strainer Hole Size FE-SEM at 50X Magnification (s3_m03.Tif)

Figure 8.2.1.62– NUKON Fibers 3/32" Strainer Hole Size FE-SEM at 50X Magnification (s3_m04.Tif)

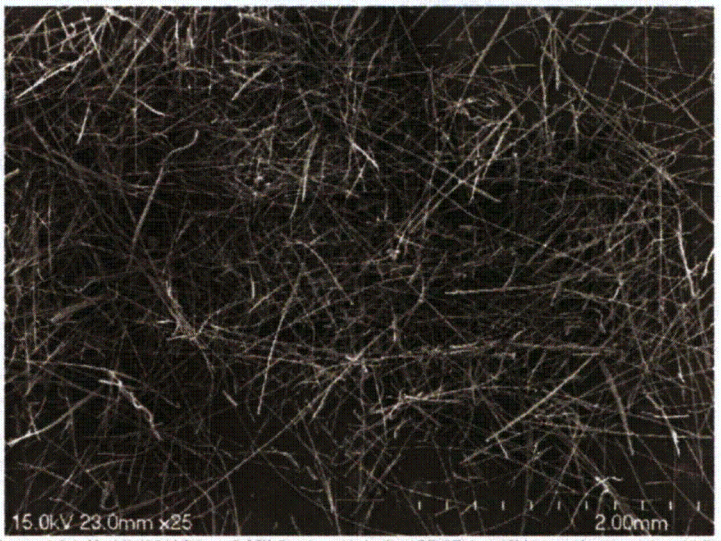

Figure 8.2.1.63– NUKON Fibers 3/32" Strainer Hole Size FE-SEM at 25X Magnification (s3_m05.Tif)

8.2.2- Measured Images from FE-SEM

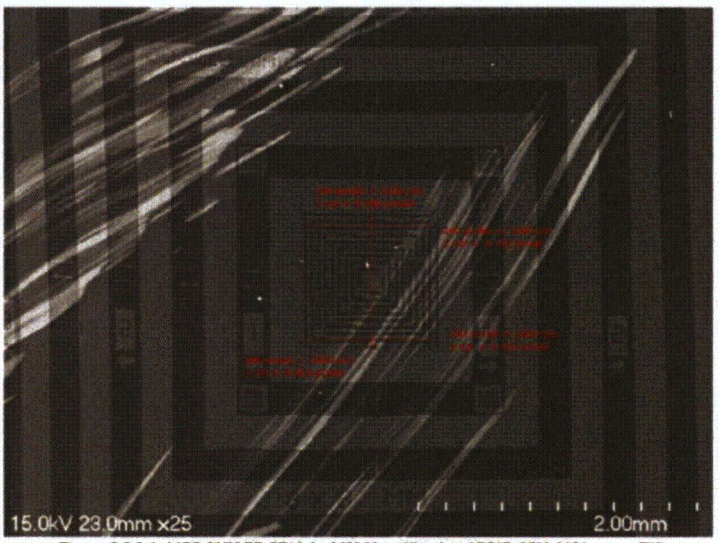

Figure 8.2.2.1- MRS-3XY FE-SEM At 30X Magnification (GRID 25X_M01_meas.Tif)

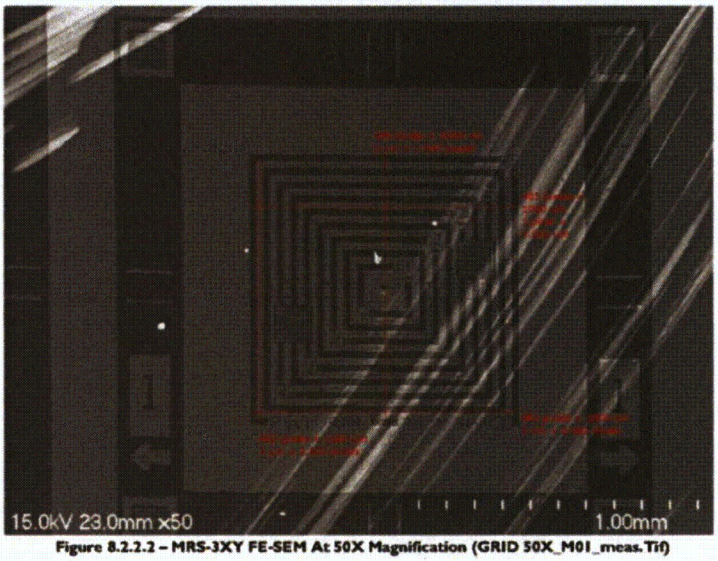

Figure 8.2.2.2 – MRS-3XY FE-SEM At 50X Magnification (GRID 50X_M01_meas.Tif)

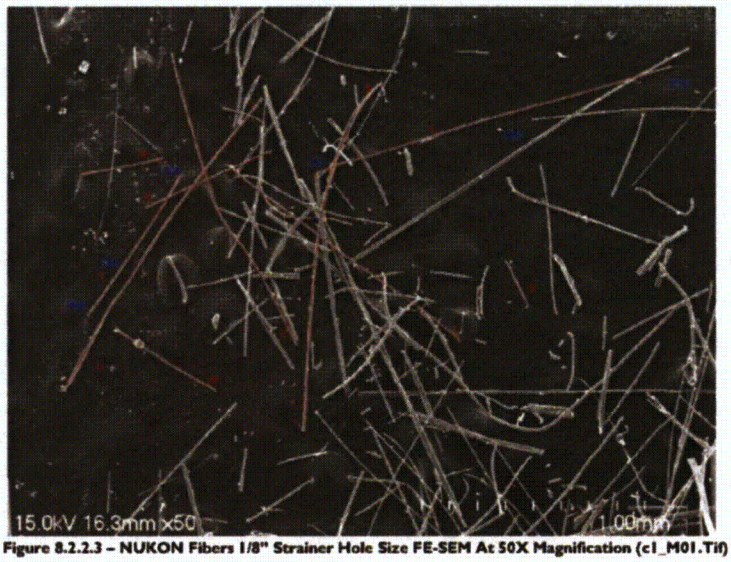

Figure 8.2.2.3 – NUKON Fibers 1/8" Strainer Hole Size FE-SEM At 50X Magnification (c1_M01.Tif)

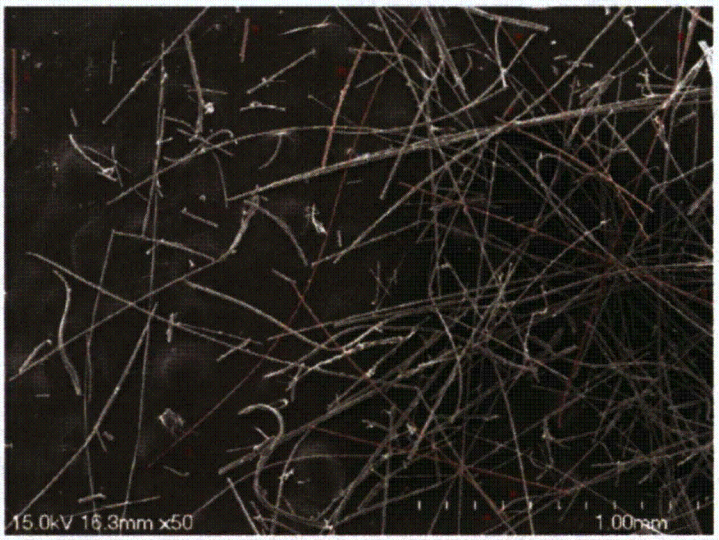

Figure 8.2.2.4 - NUKON Fibers 1/8" Strainer Hole Size FE-SEM At 50X Magnification (c1_M02.Tif)

Figure 8.2.2.5 – NUKON Fibers 1/8" Strainer Hole Size FE-SEM At 50X Magnification (c1_M03.Tif)

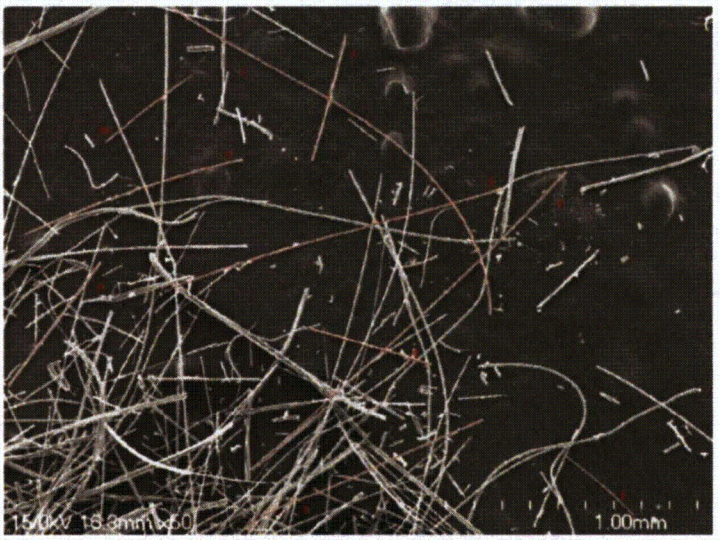

Figure 8.2.2.6 – NUKON Fibers 1/8" Strainer Hole Size FE-SEM At 50X Magnification (c1_M04.Tif)

Figure 8.2.2.7 – NUKON Fibers 1/8" Strainer Hole Size FE-SEM At 25X Magnification (c1_M05.Tif)

Figure 8.2.2.8 – NUKON Fibers 1/8" Strainer Hole Size FE-SEM At 50X Magnification (c2_M01.Tif)

Figure 8.2.2.9 – NUKON Fibers 1/8" Strainer Hole Size FE-SEM At 50X Magnification (c2_M02.Tif)

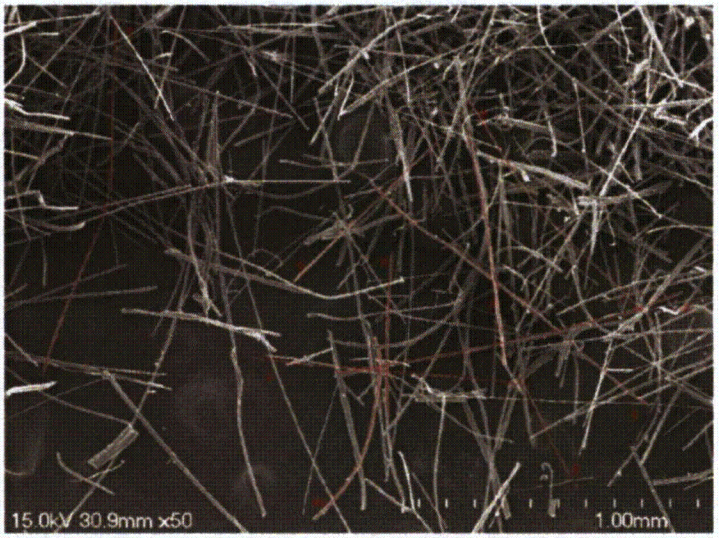

Figure 8.2.2.10 – NUKON Fibers 1/8" Strainer Hole Size FE-SEM At 50X Magnification (c2_M03.Tif)

Figure 8.2.2.11 – NUKON Fibers 1/8" Strainer Hole Size FE-SEM At 50X Magnification (c2_M04.Tif)

Figure 8.2.2.12 – NUKON Fibers 1/8" Strainer Hole Size FE-SEM At 25X Magnification (c2_M05.Tif)

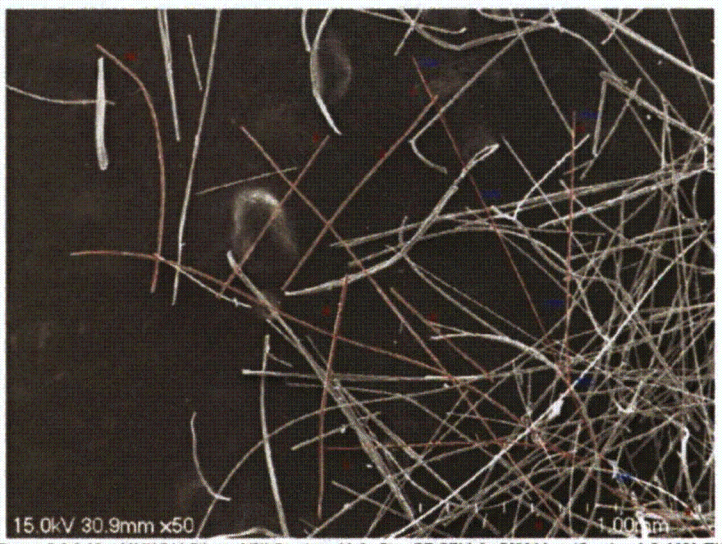

Figure 8.2.2.13 – NUKON Fibers 1/8" Strainer Hole Size FE-SEM At 50X Magnification (c3_M01.Tif)

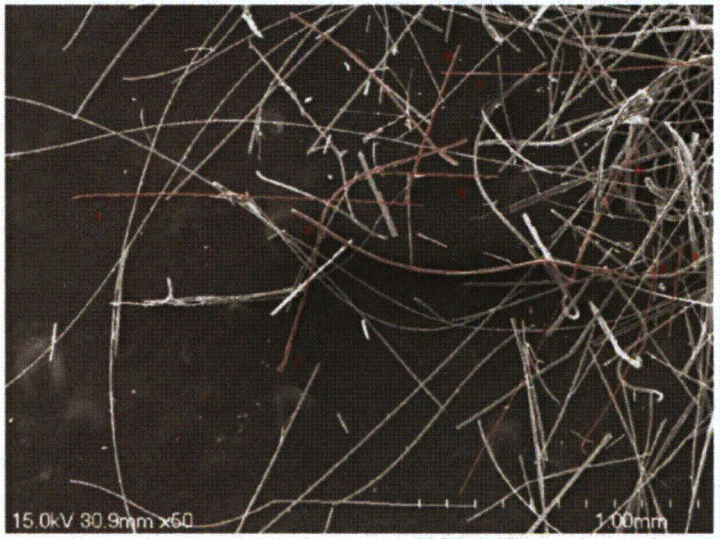

Figure 8.2.2.14 – NUKON Fibers 1/8" Strainer Hole Size FE-SEM At 50X Magnification (c3_M02.Tif)

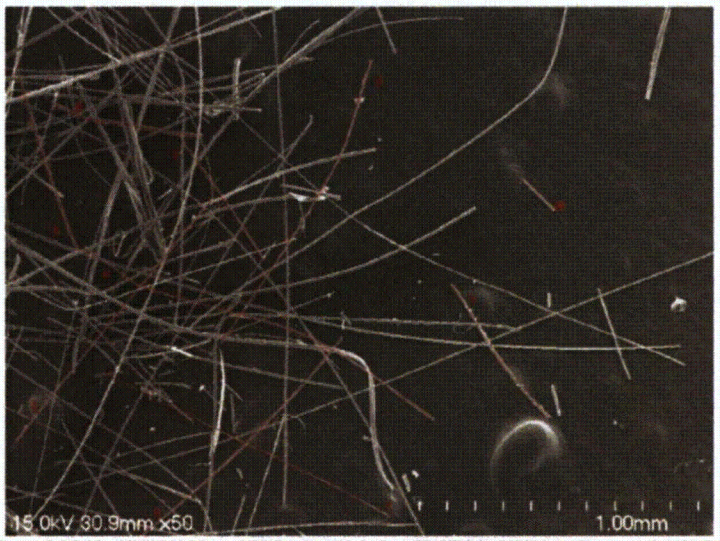

Figure 8.2.2.15 – NUKON Fibers 1/8" Strainer Hole Size FE-SEM At 50X Magnification (c3_M03.Tif)

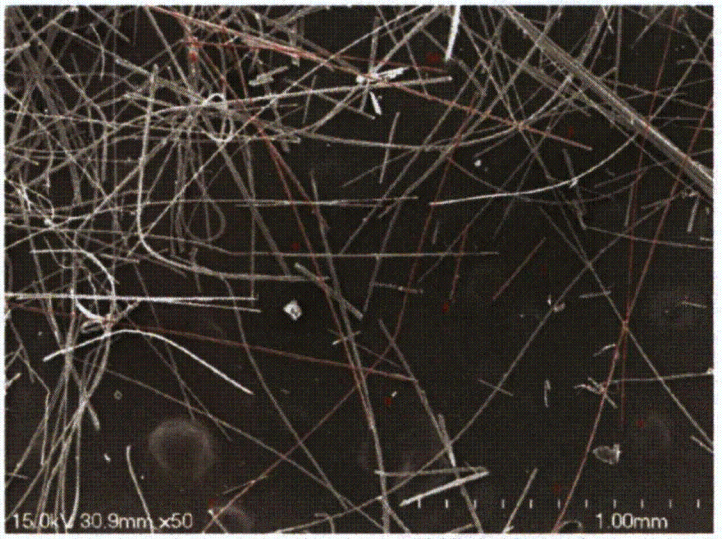

Figure 8.2.2.16 – NUKON Fibers 1/8" Strainer Hole Size FE-SEM At 50X Magnification (c3_M04.Tif)

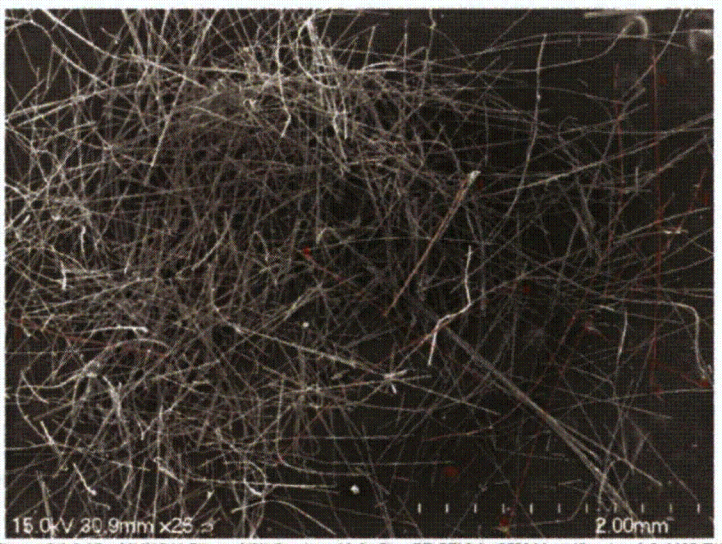

Figure 8.2.2.17 – NUKON Fibers 1/8" Strainer Hole Size FE-SEM At 25X Magnification (c3_M05.Tif)

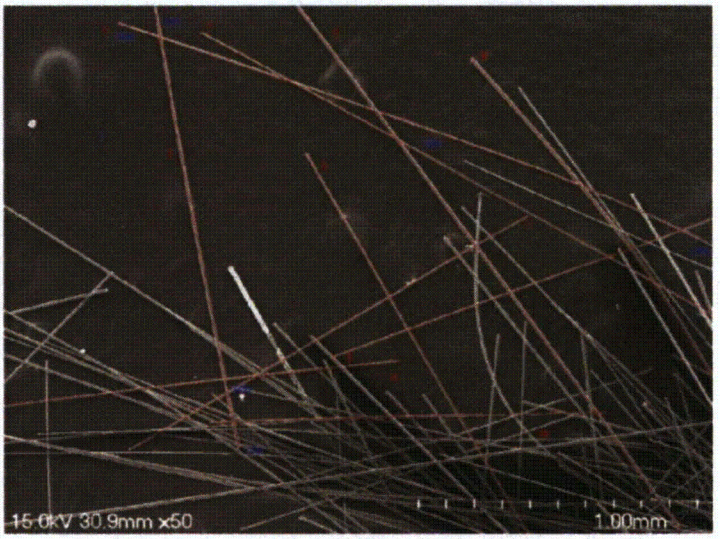

Figure 8.2.2.18 – Temp-Mat Fibers FE-SEM At 50X Magnification (d1_M01.Tif)

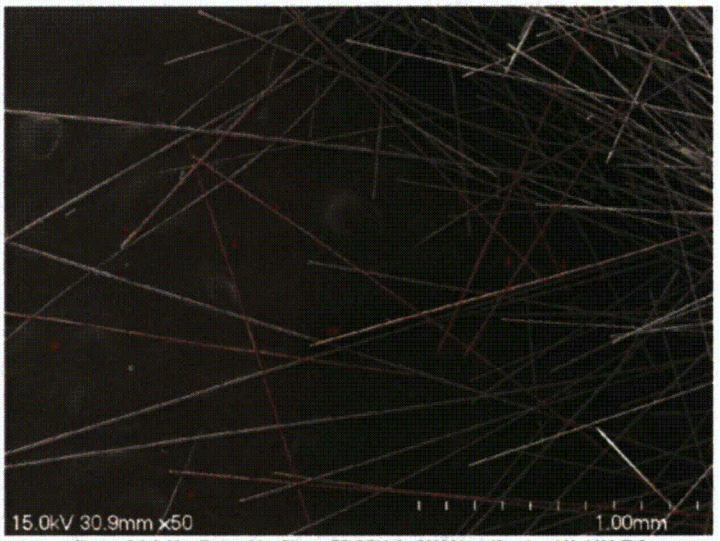

Figure 8.2.2.19 – Temp-Mat Fibers FE-SEM At 50X Magnification (d1_M02.Tif)

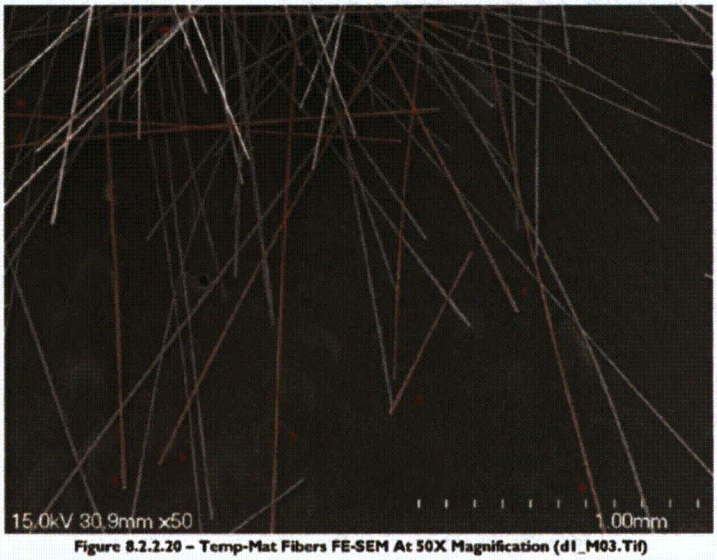

Figure 8.2.2.20 – Temp-Mat Fibers FE-SEM At 50X Magnification (d1_M03.Tif)

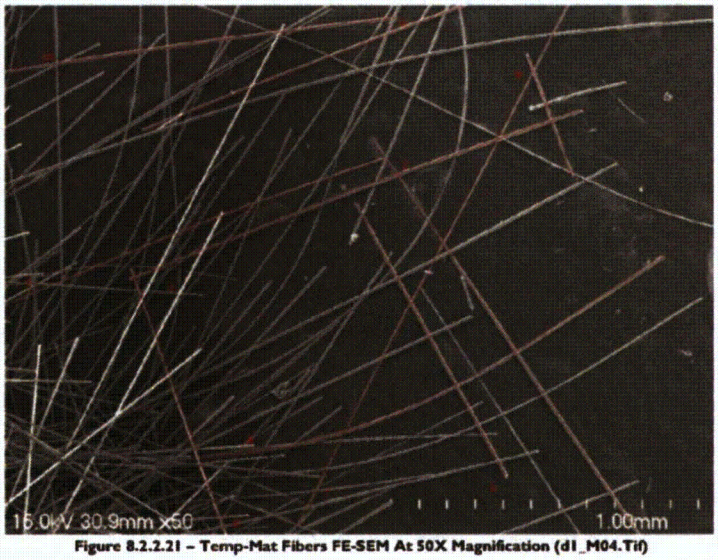

Figure 8.2.2.21 – Temp-Mat Fibers FE-SEM At 50X Magnification (d1_M04.Tif)