

Florida Department of Environmental Protection



Office of Air Monitoring

PM_{2.5} Overview & Data Flow

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April 16, 2015





PM_{2.5} Data Flow





PM_{2.5} Lab - Initial

The filters must be inventoried, inspected, and conditioned prior to weighing.

- Environmental conditions are recorded.
- Filters are inspected for damage and inventoried.
- A lot stability test is performed on filters.
- Filters are pre-conditioned.





PM_{2.5} Filter Weigh Sheet (Pre-Conditioning)

A	B	C	D	E	F	G	H	I	J	K	L	M	N
PRE/POST:	PRE	Humidity:		Temperature:									
		24 h Avg:	33.64	24 h Avg:	20.73				Cond Start Date:	03/31/2015 08:00			
		Minimum:	32.59	Minimum:	20.48				Cond End Date:	04/01/2015 08:00			
Analyst:	COTTON_K	Maximum:	35.8	Maximum:	20.97								
Balance ID:	A-MT5 1117481501	Vaisala Unit SN:	H1120114			MR			Mass reference - these go to mass reference QC table				
300 mg:	300.001	SN:33956	SD Temp:	0.14		SF			Single Filter				
500 mg:	500.002	SN:34106	SD Humidity:	0.77		LB			Lab Blank - these go to the "filter QC table"				
						BD			Batch Duplicate - these go to the "filter QC table"				
LAB BLANK													
Filter ID	Filter Type	Weight	Date/Time	Difference	Acc/Rej	Balance ID	Lab Blanks	Weight	Qualifiers	Comments			
300mg	MR	300.002	04/01/2015 08:22	0.001	Accept	A-MT5 1117481501	T4609101	378.826					
500 mg	MR	500.001	04/01/2015 08:23	-0.001	Accept	A-MT5 1117481501							
T4609103	SF	382.661	04/01/2015 08:24		Accept	A-MT5 1117481501							
T4609104	SF	379.083	04/01/2015 08:25		Accept	A-MT5 1117481501							
T4609105	SF	380.706	04/01/2015 08:26		Accept	A-MT5 1117481501							
T4609106	SF	365.169	04/01/2015 08:27		Accept	A-MT5 1117481501							
T4609107	SF	368.206	04/01/2015 08:28		Accept	A-MT5 1117481501							
T4609108	SF	369.537	04/01/2015 08:29		Accept	A-MT5 1117481501							
T4609109	SF	377.069	04/01/2015 08:30		Accept	A-MT5 1117481501							
T4609110	SF	375.261	04/01/2015 08:31		Accept	A-MT5 1117481501							
T4609111	SF	375.802	04/01/2015 08:32		Accept	A-MT5 1117481501							
T4609112	SF	373.75	04/01/2015 08:33		Accept	A-MT5 1117481501							



Filter Shipping Procedures & Documentation

The filters must be packaged in a way:

- To maintain chain-of-custody
- To protect them from damage or exposure
- To control shipment temperature





Filter Shipping Procedures & Documentation

- All filter shipments must include shipping documentation
 - The Greyhound Package Xpress (GPX) shipping invoice must be electronically signed by the lab analyst, and signed by the agency upon receipt.
- The filter cassette should be composed of all parts
 - A cassette bottom, a cassette metal screen, and a cassette top
- The magazine should be composed of all parts
 - The cassettes reside inside the magazine. The magazine has an orange cap and a yellow or black protective cap.
- The magazine should be packaged in a soft-side cooler and shipped inside a large Igloo cooler, and sealed.



Chain-of-Custody

The weighing lab provides a chain-of-custody form to track the receipt and transport of the PM_{2.5} sample filters.

- Review it.
- Compare it against the filter request and shipment.
- Sign it.
- Send it back to the weighing lab via email.



Orange County Environmental Protection Dept		Florida Department of Transportation - Westside	
300 N. Main Street Orlando, FL 32801 (407) 836-1400 Attention: Traffic/Signal, Road Protection, Signal Traffic		County Laboratory 1400 E. State Street Tallahassee, Florida 32304-0400 Request Number: 00001-1-001-000-000-000	
Measure 1 00000			
Item #	Item Name	Item Code	Quantity
000001	000001-0001	000001	1
000002	000002-0002	000002	1
000003	000003-0003	000003	1
000004	000004-0004	000004	1
000005	000005-0005	000005	1
000006	000006-0006	000006	1
000007	000007-0007	000007	1
000008	000008-0008	000008	1
000009	000009-0009	000009	1
000010	000010-0010	000010	1
Measure 2 00010			
Item #	Item Name	Item Code	Quantity
000101	000101-0001	000101	1

Summary

Measure 1 00000

Measure 2 00010

Total: 327483

Submitted By	<i>[Signature]</i>	City of Orlando
Submitted Date	02/10/2014 08:00 AM	
Submitted By		
Submitted Date		



Chain-of-Custody

PM2.5 Filter Custody Log

Page 1 of 1

Hillsborough County Environmental Protection Commission
Air Monitoring Division
3629 Queen Palm Drive
Tampa, FL 33619
(813) 627-2600
Attention: Tom Tamanini

Florida Department of Environmental Protection
Central Laboratory
2600 Blair Stone Road
Tallahassee, Florida 32399-2400
Request Number: PM2.5-RQ-2006-05-22-12

Magazine # M0007

<u>Filter #</u>	<u>Cassette#</u>	<u>DateWeighed</u>	<u>FilterOrder</u>	<u>ExpirationDate</u>
T4033363	RP40802	17-MAY-2006	1	16-JUN-2006
T4033364	RP041879	17-MAY-2006	2	16-JUN-2006
T4033365	RP002468	17-MAY-2006	3	16-JUN-2006
T4033366	RP024821	17-MAY-2006	4	16-JUN-2006

Magazine # M0200

<u>Filter #</u>	<u>Cassette#</u>	<u>DateWeighed</u>	<u>FilterOrder</u>	<u>ExpirationDate</u>
T4033367	RP053967	17-MAY-2006	1	16-JUN-2006
T4033368	RP006423	17-MAY-2006	2	16-JUN-2006
T4033369	RP48068	17-MAY-2006	3	16-JUN-2006
T4033370	RP49519	17-MAY-2006	4	16-JUN-2006

Magazine # M0246

<u>Filter #</u>	<u>Cassette#</u>	<u>DateWeighed</u>	<u>FilterOrder</u>	<u>ExpirationDate</u>
T4033371	RP40890	17-MAY-2006	1	16-JUN-2006
T4033372	RP49435	17-MAY-2006	2	16-JUN-2006
T4033373	RP003500	17-MAY-2006	3	16-JUN-2006
T4033374	RP48064	17-MAY-2006	4	16-JUN-2006

Magazine # M0318

<u>Filter #</u>	<u>Cassette#</u>	<u>DateWeighed</u>	<u>FilterOrder</u>	<u>ExpirationDate</u>
T4033375	RP49206	17-MAY-2006	1	16-JUN-2006
T4033376	RP005691	17-MAY-2006	2	16-JUN-2006
T4033377	RP042068	17-MAY-2006	3	16-JUN-2006
T4033378	RP48058	17-MAY-2006	4	16-JUN-2006

Magazine # M0339

<u>Filter #</u>	<u>Cassette#</u>	<u>DateWeighed</u>	<u>FilterOrder</u>	<u>ExpirationDate</u>
T4033379	RP48798	17-MAY-2006	1	16-JUN-2006

Relinquished by: _____
Date/Time: _____
Received By: _____
Date/Time: _____





PM_{2.5} Lab - Receiving

The weighing lab does the following upon receipt of the sample filters from the agency:

- Inspects cooler and documents any damages or irregularities
- Measures the current temperature inside the softside filter storage cooler and records this temperature on the received Manifest documents
- Verifies that the cooler temperature is written on the custody documents
- Removes magazines from cooler and inspects them
- Allows magazines to come to an equilibrium at room temperature



PM_{2.5} Lab – Receiving (continued)

- Moves the magazines to the conditioned weigh environment once they are at room temperature
- Removes filters from magazine and inspects filters for damage
- Conditions the filters





PM_{2.5} Filter Weigh Sheet (Post-Conditioning)

PRE/POST:	POST	Humidity:		Temperature:							
		24 h Avg:	33.04	24 h Avg:	21.03				Cond Start Date:	04/06/2015 08:00	
		Minimum:	31.33	Minimum:	19.2				Cond End Date:	04/07/2015 08:00	
Analyst:	COTTON_K	Maximum:	37.47	Maximum:	21.36						
Balance ID:	A-MT5 1117481501	Vaisala Unit SN:	H1120114	MR		Mass reference - these go to mass reference QC table					
300 mg:	300.001	SN:33956	SD Temp:	0.2	SF	Single Filter					
500 mg:	500.002	SN:34106	SD Humidity:	0.7	LB	Lab Blank - these go to the "filter QC table"					
					BD	Batch Duplicate - these go to the "filter QC table"					
LAB BLANK											
<u>Filter ID</u>	<u>Filter Type</u>	<u>Weight</u>	<u>Date/Time</u>	<u>Difference</u>	<u>Acc/Rej</u>	<u>Balance ID</u>	<u>Lab Blanks</u>	<u>Weight</u>	<u>Qualifiers</u>	<u>Comments</u>	
300mg	MR	300.001	04/07/2015 09:00	0	Accept	A-MT5 1117481501	T4608451	362.537			
500 mg	MR	500.001	04/07/2015 09:01	-0.001	Accept	A-MT5 1117481501	T4608351	373.73			
T4608452	SF	365.368	04/07/2015 09:02		Accept	A-MT5 1117481501				A Halon suppression event occurred in weighing lab.	
T4608453	SF	362.979	04/07/2015 09:03		Accept	A-MT5 1117481501				A Halon suppression event occurred in weighing lab.	
T4608454	SF	373.665	04/07/2015 09:04		Accept	A-MT5 1117481501				A Halon suppression event occurred in weighing lab.	
T4608456	SF	372.153	04/07/2015 09:05		Accept	A-MT5 1117481501				A Halon suppression event occurred in weighing lab.	
T4608457	SF	382.57	04/07/2015 09:06		Accept	A-MT5 1117481501				A Halon suppression event occurred in weighing lab.	
T4608458	SF	380.298	04/07/2015 09:07		Accept	A-MT5 1117481501				A Halon suppression event occurred in weighing lab.	
T4608459	SF	375.957	04/07/2015 09:08		Accept	A-MT5 1117481501				A Halon suppression event occurred in weighing lab.	
T4608460	SF	378.282	04/07/2015 09:09		Accept	A-MT5 1117481501				A Halon suppression event occurred in weighing lab.	
T4608461	SF	369.838	04/07/2015 09:10		Accept	A-MT5 1117481501				A Halon suppression event occurred in weighing lab.	
T4608462	SF	367.628	04/07/2015 09:11		Accept	A-MT5 1117481501				A Halon suppression event occurred in weighing lab.	
300mg	MR	299.999	04/07/2015 09:12	-0.002	Accept	A-MT5 1117481501				A Halon suppression event occurred in weighing lab.	



Flags for Damaged, Voided Filters, or Holding Times

- | | |
|--|-----|
| • Filter damage observed upon receipt (pinhole) | SIS |
| • Filter upside down in magazine upon receipt in lab | SIS |
| • Filter was not received in magazine | SIS |
| • Foreign object on filter surface (particle, fiber) | SIS |
| • Laboratory accident or damage | LAC |
| • Filter damaged during shipment | PSD |
| • Filter expired in field | HTE |
| • Filter expired in laboratory | THE |
| • Holding time in field exceeded 177 hours | THE |
| • Filter indicated as not sampled | VOD |
| • Filter voided by customer | VOD |
| • Exceeded temperature parameters in lab | FLT |
| • Exceeded humidity parameters in lab | FLH |



PM_{2.5} Analysis Report

PM2.5 Analysis Report

Florida Department of Environmental Protection
Central Laboratory
2800 Blair Stone Road
Tallahassee, Florida 32399-2400

Filters Received in Magazine: M0041

	<u>Weight (mg)/Delta (ug)</u>	<u>Date</u>	<u>Qualifier</u>	<u>Comment</u>
T4606025				
PRE	383.135	18-NOV-2014 09:19		
POST	383.392	29-DEC-2014 14:19		
DELTA	257	NA		
T4606203				
PRE	376.23	24-NOV-2014 09:15		
POST	376.544	29-DEC-2014 08:26	SIS	Substance on filter surface.
DELTA	314	NA		
T4606204				
PRE	376.309	24-NOV-2014 09:16		
POST	376.59	29-DEC-2014 08:27	SIS	Substance on filter surface.
DELTA	281	NA		

- The lab flags will show up on the Analysis Report.
- Investigate the cause.
- It may result in the data validator having to add qualifiers or null codes to a sample.



PM_{2.5} Analysis Report (continued)

Filters Received in Magazine: M0334

T4608434	<u>Weight (mg)/Delta (ug)</u>	<u>Date</u>	<u>Qualifier</u>	<u>Comment</u>
PRE	377.323	03-MAR-2015 10:04		
POST	377.893	07-APR-2015 10:19		A Halon suppression event occurred in weighing lab.
DELTA	570	NA		

What needs to happen? Invalidate? Qualify?



Run Data Sheets

- **If** you prefill forms...
 - Pay attention to any data that has changed and update it
- Take your time!
 - Someone needs to understand what the document says later on
- Changes need to have a strikethrough and initial with a date next to EACH item that was changed

PM2.5 SAMPLER RUN DATA SHEET

SITE NAME: _____ AIRS#: _____

SAMPLER MFR: Rupprecht & Patashnick MODEL: 2025

WINS IMPACTOR #: 42910 S/N: _____

FILTER ID / SCREEN#: 77339229 1 QUESTIONABLE: ☒ YES ☒ NO

START DATE/TIME: 3/28/13 1 00 : 00 EST VOID: ☒ YES ☒ NO

STOP DATE/TIME: 3/30/13 1 00 : 00 EST BLANK FILTER ☐ YES ☒ NO

VALID ELAPSED TIME: 24 : 00 HOUR:MIN

INITIAL CONDITIONS

DID THE SAMPLER PASS THE:

AMBIENT TEMPERATURE CHECK ($\pm 5^{\circ}\text{C}$)? ☒ YES ☐ NO

AMBIENT PRESSURE CHECK (± 10 of 760 mm-Hg or the transfer standard)? ☒ YES ☐ NO

AVERAGE FLOW RATE (15.86 TO 17.54 l/min)? ☒ YES ☐ NO

OPERATOR INITIALS: .. DATE: 3-28-13 3/28/13

FINAL CONDITIONS

DID THE SAMPLER PASS THE:

AMBIENT TEMPERATURE CHECK ($\pm 5^{\circ}\text{C}$)? ☒ YES ☐ NO

AMBIENT PRESSURE CHECK (± 10 of 760 mm-Hg or the transfer standard)? ☒ YES ☐ NO

FLOW RATE (15.86 TO 17.54 l/min)? ☒ YES ☐ NO

Avg Flow 16.7 l/min % cv 0.0 % Vol Sampled 240 l/min

WAS THE FILTER STORED UNDER CONTROLLED CONDITIONS? ☒ YES ☐ NO

All Optional	MIN <u>5.1</u>	AVG <u>13.6</u>	MAX <u>10.5</u>	ON ARRIVAL STATUS: <u>OK</u>	MODE: <u>DRIVE</u>
AMB TEMP	<u>47.5</u>	<u>5.5</u>	<u>11.9</u>	POWER FAILURES?	
FLOW	<u>16.6</u>	<u>16.4</u>	<u>16.7</u>	<u>Sample time out of range</u>	
PRESS.	<u>765</u>	<u>767</u>	<u>770</u>		

SUPPLY MAG: 110317 STORAGE MAG: 110156

MAX TEMP DIFF: 4.2 TIME: 14:45 DATE: 3/29/13

COMMENTS: _____

OPERATOR INITIALS: _____ DATE: 3/28/13 4/2/13

VERIFIED BY: _____ DATE: 4-16-13

Actual sample start - 11:37 AM
Actual sample stop - 11:37 AM
Re-set up, due power failure 3/28/13



F1 Files to PMTS

- How often do you upload F1 files?
 - Weekly?
 - Monthly?
- Uploading the F1 file will marry up the data from the lab with the data from the field
- You can see this when you run a Compare Collocated Report

The screenshot shows the 'Particulate Matter Filter Tracking' web application. The header includes navigation links: PM2.5 Home | Filter Data | Information | Reports | Validation Status | A. The main content area is titled 'South' and displays a table of filter data. The table has three columns: 'Shipping Data', 'Field Data', and 'Lab Data w/o Field Data'. The 'Shipping Data' column lists 'Shipping Data' and 'Field Data (0 filters without Lab Data)'. The 'Field Data' column lists 'Field Data (0 filters without Lab Data)'. The 'Lab Data w/o Field Data' column lists 'Lab Data (55 filters not validated and transferred to FAMAS)'. A dropdown menu is open over the 'Field Data' column, showing options: 'Upload Field Data', 'Edit Field Data', 'Ignore Filters', and 'Validate Data'.

Shipping Data	Field Data	Lab Data w/o Field Data
Shipping Data	Field Data (0 filters without Lab Data)	Lab Data (55 filters not validated and transferred to FAMAS)

NOTE: Make sure PMTS is updated with the correct samplers or the F1 upload will fail



Validating Filters in PMTS

- Take note of the Lab Flags, Field Status codes, and if a parameter has exceeded the acceptable ranges, etc.
- You can add QA Qualifiers to a parameter in the AIRS Validity column dropdown and apply null codes from the Null Data Code dropdown

Particulate Matter Filter Tracking

PM2.5 Home | Filter Data | Information | Reports | Validation Status | Administrative Menu | Help |

Data validation for MILLHOPPER Primary Sampler (PM 2.5) Time Limitations Exceeded

Previous	Next	Show All	Validate filters			
Filter	Act Start Date	Lab Flags	Field Status	Conc.	Validate	Ignore
T4608045	2015-02-26 00:00	HTE	00000000	3.4	☐	☐

Parameter Data		Filter Data					
Parameter	Units	EMC Code	Raw Data	Dec.	Value	AIRS Validity	Null Data Code
Flow Rate And Cv For The Period	%	CV25	0	0	0000		
Sample Volume Total	m ³	SV25	24.1	1	0241		
Ambient Min Temp	° C	TN25	10.8	1	0108		
Ambient Max Temp	° C	TX25	23.4	1	0234		
Ambient Avg Temp	° C	TA25	15.2	1	0152		
Ambient Min Press	mmHg	PN25	744	0	0744		
Ambient Max Press	mmHg	PX25	759	0	0759		
Ambient Avg Press	mmHg	PA25	752	0	0752		
Elapsed Sample Time	minutes	ST25	1440	0	1440		
PM 2.5 Concentration	µg/m ³	PM25	3.4	1	0034		

Repeat concentration choice for all parameters



Data Transfer to FAMAS

- Caveats:
 - Must transfer an entire month at once or else data will be left behind and you will need an administrator of PMTS to reset quarterly verifications

Highlight	[None]	Void Negatives	Fill Blanks	Null Code	QA Qualifier	Exclusion	Comment	Excel	Report	Audit Trail																						
Jan	NS	NS	5.3	NS	NS	10.0	NS	NS	9.5	NS	NS	7.4	NS	NS	5.3	NS	NS	15.0	NS	NS	10.1	NS	NS	3.5	NS	NS	8.7	NS	NS	14.6	NS	Jan
Feb	NS	3.9	NS	NS	4.4	NS	NS	14.2	NS	NS	9.5	NS	NS	22.5	NS	NS	4.2	NS	NS	9.2	NS	NS	5.5	NS	NS	2.6	NS	NS			Feb	
Mar	9.9	NS	NS	4.0	NS	NS	17.3	NS	NS	5.7	NS	NS	6.0	NS	NS	13.0	NS	NS	14.1	NS	NS	8.7	NS	NS	NS	NS	NS	NS	NS	NS	Mar	
Apr	NS	NS		NS	NS		NS	NS																							Apr	
May																															May	
Jun																															Jun	
Jul																															Jul	
Aug																															Aug	
Sep																															Sep	
Oct																															Oct	
Nov																															Nov	
Dec																															Dec	

(Double-click reading for more info.)

Legend:

Invalid

###

Valid w/flag

###

Changed

###

Exclusion

###

QA

Blank

NS

Not Scheduled



Blank Filters

Highlight

[None]

Null Code

QA Qualifier

Exclusion

Comment

Excel

Report

Audit Trail

Jan	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Jan
Feb	NS	NS	-1.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	6.0	NS	NS	NS	NS				Feb
Mar	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	6.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	Mar
Apr	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Apr
May	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	May
Jun	NS	NS	NS	NS	NS	NS	NS	NS	9.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-3.0	Jun
Jul	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Jul
Aug	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	Aug
Sep	-6.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	Sep
Oct	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Oct
Nov	NS	NS	14.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	Nov
Dec	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-4.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	Dec

(Double-click reading for more info.)

Legend:

Invalid

Valid w/flag

Changed

Exclusion

QA

NS No Data

- What would you do if you had a blank filter of 318 μg ???
- Field blanks with weight change over 30 μg may indicate contamination during transport or at the sampler
- 10% of the monitors sampling frequency should be blanks
 - Evenly spaced throughout the year?
 - 10% in one quarter and done for the year?



FAMAS to AQS and Beyond

- Just like all other data that makes its way to FAMAS, the PM_{2.5} manual data, supporting parameters, and filter blanks all need to be verified by the QA Coordinator
- Then sent to AQS
- And finally, certified for use in attainment decisions

Every step of the way from air to AQS is equally important!



Questions?

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