

# Frequently Asked Questions and Answers Associated with Deployment of MTL 46.2 mm PTFE Filters in the PM<sub>2.5</sub>, PM-10, and Low-volume Lead (Pb) Monitoring Networks

February 15, 2011

(Additional Q's and A's will be added as necessary)

1. Question: What are the significant differences between the legacy Whatman “2 μm PTFE 46.2 mm Filter: PP Ring Supported for PM 2.5” and the new MTL PTFE 46.2 mm Filter with PFA Support Ring?

Answer: See the Table below

Characteristic	Whatman	MTL filter	Comments
Filter membrane	PTFE	PTFE	MTL claims to use the same supplier
Nominal Filter Mass	146-150 mg	400-410 mg	Increase due to new support ring material
Support Ring Chemistry	Pure Polymethylpentene (PMP)	Polyfluoro alkoxy (PFA)	
Support ring Flex Modulus	210,000 PSI	85,000 PSI	Goal is to eliminate the “Pringle™” effect
Support Ring Density	~0.84g/cm <sup>3</sup>	~2.2g/cm <sup>3</sup>	Adds substantial mass to the gross filter mass
Support ring compressibility	Not Quantified or reported	MTL claim is less than PMP	Similar to PTFE, which is the primary copolymer
Support Ring nominal avg. thickness	0.013 in 0.320 mm	0.016 in 0.394 mm	Contract specification is 0.31- 0.42 mm
Filter Identification	S/N printed on PMP ring	S/N printed on both sides of filter media	Alpha Numeric in straight line or in arc inside the PFA ring or bar code patch.
Ink chemistry	Unknown and not important since it is not on the filter	microfine particles of carbon in an aqueous suspension	Ink will not adhere to PFA
Dielectric Const.	2.1	2.1	

2. Question: Will MTL filters exacerbate the mechanical filter cassette shuttle jams in the old R & P and new Thermo 2025 Partisol samplers?

Answer: No significant increase in the incidence of shuttle jams is anticipated. Four out of five State monitoring agencies, whose staff ran several collocated sampling events with Whatman and MTL filters, experienced no shuttle jams with older or newer 2025 Partisol samplers. One agency saw 2 jams, one with a blue polycarbonate cassette and

another with the white Delrin™ cassette. The sampler was an old R & P 2025 Partisol Sampler.

3. Question: Will the new MTL filters introduce any new bias to PM<sub>2.5</sub> mass measurement compared to the measurements based on Whatman PTFE filters?

Answer: Numerous tests have been conducted by EPA, several state agencies, and BGI Inc. Differences in mass measurements have averaged well below 0.1 μg/m<sup>3</sup>.

4. Question: How are labs supposed to address the significantly higher pristine filter mass of the MTL filters?

Answer: Labs will need to procure new calibration and quality control check weights to bracket the range of filter and filtrates that are anticipated for their clients' monitoring sites. The high side weight used for the Whatman filters (usually 200 mg or 300 mg) can be used as the low-end weight for the MTL. The high side weight for the MTL filters should be 450 mg or 500mg. Rice Lake and Troemner market the 450 mg weights and there may be other suppliers. Every lab will have to revise their data management software to accommodate the higher MTL filter mass.

5. Question: Will the alpha numeric serial number printed on both sides of the MTL filter membrane cause any change in flow characteristics?

Answer: No apparent effects on flow rate have been detected. The filter acceptance testing revealed Whatman and MTL filters exhibit the same pressure drop across the membrane. In the collocation tests conducted by State agencies, no anomalous flow rates or total volumes were reported.

6. Question: Will the alpha numeric serial number printed on both sides of the MTL filter membrane influence the measurement of elements deposited on the filter?

Answer: EPA analyzed by XRF 10 MTL filters with alphanumeric serial numbers that were printed on the perimeter of the filter membrane. EPA found that all elements targeted for identification yielded responses that are below detection limits, but it is unclear that the XRF excitation beam impinged on the serial number. Since the XRF instrument that EPA used employs the largest diameter excitation beam that is commercially available, it was concluded that the serial number on the perimeter of the filter membrane will not affect elemental analysis by XRF.

7. Question: Will bar coded serial numbers be available in the future?

Answer: The answer is not clear at this time. EPA will conduct additional testing on the effects of the printing ink on two sides of the filter. The bar codes must be applied slightly offset of the center of the filter, which is directly in the area that would be analyzed by XRF for elements. The deposit also covers more surface area of the filter; therefore, the effects on flow rate have to be characterized. Since not every agency has

bar code readers the situation might call for two different types of serial numbers. The current contract does not allow for bar coded serial numbers; therefore, significant contract implications on the filters price could arise. if the production batch is divided into two different serial number configurations.

8. Question: Will MTL filters be deployed in the chemical speciation network (CSN)?

Answer: EPA does not have any direct control over the filters used in the CSN. That decision will be made by RTI International, who supplies the filters to the sites in the CSN. The absence of bias between the 2 brands of filters alleviates any technical concern, whichever decision is made.

9. Question: What is the significance of multiple production lot numbers on the groups of boxes that have been shipped to each monitoring agency.

Answer: All filters distributed each year are and will be in the future produced from a single production lot of the filter membrane material. This is a contract specification. See the direct quote from Brian Dueber of MTL.

From:	"Brian Dueber" <bdueber@mtlcorp.com>
To:	Margaret Dougherty/RTP/USEPA/US@EPA
Date:	02/17/2011 12:24 PM
Subject:	lot numbers

Hi Maggie –

Confirming that all filters were produced from one lot of raw materials as required by the contract. The lot numbers on the boxes are internal to MTL only. I thought this would eventually cause some confusion. Sorry!

Brian

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10. Question: Are there any outstanding technical question or issues that EPA will be addressing with respect to use of MTL filters.

Answer: The acceptance test for moisture uptake suggested that equilibration may require longer than 24 hours. Increasing the humidity from 35% RH to 40% RH did not reveal any mass gain, but 40 out of 50 filters actually lost additional mass when equilibrated at the higher humidity. The mass loss was very small in all cases, but the percentage of filters that lost mass (80%) was compelling. EPA recommends that each lab conducts a 72 hour mass stability test on about 10 filters to determine if their particular lab conditions will generate the same results.

February 23, 2011.

11. Question: Are Monitoring agencies required to switch over to MTL filters upon receipt of the new shipment?

Answer: No. Monitoring agencies may choose to use up their old supply, which is advisable if they have a substantial inventory. We do advise agencies to record the exact date they change over; although it will be hard to miss the 250 mg increase in unexposed filter mass.

12. Question: Where can 450 mg gravimetric check weights be purchased?

Answer: We have identified two primary suppliers of calibration and check weights in the US. Rice Lake Rice Lake Weighing Systems, < <http://www.ricelake.com/>>; and Troemner Calibration Technologies & Precision Weights,

< <http://www.troemner.com/index.php>>. The 450 mg weight may best be acquired through a calibration service company who may be able to work a better deal with the suppliers. We have seen quotes as low as \$120 for Single Class 1 weights.