

Standard Operating Procedures for Procurement and Acceptance Testing of Teflon, Nylon, and Quartz Filters

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PROCEDURES FOR PROCUREMENT AND ACCEPTANCE TESTING OF TEFLON, NYLON, AND QUARTZ FILTERS

1.0 Purpose and Applicability

This document outlines procedures for procurement and acceptance testing of Teflon, nylon, and quartz filters for their use in chemical speciation of PM_{2.5}. Research Triangle Institute (RTI) has contacted the below mentioned manufacturers/suppliers to confirm their ability to supply the needed filters. Mention of specific suppliers or trade names does not constitute endorsement by RTI.

Teflon filters (Whatman PTFE Teflon Filters) will be purchased from VWR Scientific (Cat. No. 7592-104). Nylon filters (Gelman Nylasorb™, 47 mm diameter, 1 micron pore size, Product No.66509) will be purchased from VWR Scientific (Cat. No. 27377-064). If Prefired quartz filters (Pallflex 2500 QAT-UP, 47 mm diameter) are needed, they will be purchased from Sunset Laboratories and will be received in individual petri dishes. RTI will have the capability to prefire the quartz filters.

2.0 Procedures for Filter Procurement

The individual task leaders along with the sample custodian will have the responsibility for determining project materials and supply requirements including those of filters needed for collecting ambient aerosol samples. The number of filters ordered should be sufficient for all planned field activities, planned acceptance testing protocols, and field and laboratory quality assurance and quality control activities. Due to extended lead times often required for large filter procurements and the accompanying acceptance testing, filters should be ordered at least 90 days prior to the expected day of field use. The procedure for ordering filters is as follows:

- 2.1 Contact the filter's supplier and obtain a written (or documented verbal) price quote for the intended quantity of filters required. The quote should include per unit price, expected ship date, and expected delivery date. Ensure that the quote is based on the vendor's understanding that all procured filters will be from the same manufacturing lot.
 - 2.2 Complete an RTI requisition containing the following information:
 - filter manufacture's product number
 - supplier's product number
 - complete product description and specifications
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- unit size
 - number of units required
 - unit price and extended price
 - specification that all filters must be supplied from the same manufacturer's lot number
 - statement that supplier can ship partial orders
 - required receipt date for completed order
 - copy of written price quote and/or name and date of supplier's customer service representative who provided the verbal quote
 - supplier's name, address, phone number, fax number, and contact name
 - desired procurement priority
 - date that the requisition will be faxed to RTI's Office of Purchasing (OP)
 - RTI project and overhead number
 - individual signatures and ID numbers of personnel requesting and approving the procurement
- 2.3 Remove the pink copy and file it in the project requisition file for future reference.
- 2.4 Fax the requisition to RTI's OP and ensure that the transmission was successful. Place the yellow and white sheets of the requisition into RTI's outbox for subsequent delivery to the RTI program administrative assistant.
- 2.5 Approximately one week after the requisition was submitted, call RTI's OP with the requisition number and record the purchase order number. The supplier should then be called to ensure that the purchase order was received and that the terms of the order can be properly fulfilled.
- 2.6 Upon receipt of each filter shipment, inspect the shipment to verify that the items appear to be in good condition and that the receiving order accurately represents the shipment's actual contents. If so, sign and date the receiving order, make a photocopy for the RTI project leader, and submit the original to the RTI program administrative assistant. If a discrepancy in shipment contents or condition is noted, contact the supplier to resolve the problem. If defective materials need to be returned to the supplier, obtain a Return Authorization Number from the supplier, fill out an RTI Materials Discrepancy Report, and ship the contents to the supplier using 2-day UPS service.
- 2.7 Store acceptable procured filters in their original bulk containers in a climate controlled environment until required for use. Maintain copies of purchase and lot documentation in the filter storage location.
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3.0 Filter Acceptance Testing

Filters procured for research purposes typically have project-specific testing and acceptance requirements. Although Teflon filters procured for PM_{2.5} compliance measurements have detailed specifications and acceptance testing requirements for example, subsequent chemical analysis of collected aerosol deposits places additional acceptance testing requirements on the filters depending upon the analytical technique used and the analytes of interest.

Regardless of the filter type or the project's specific analytical requirements, filters must be examined individually prior to use to ensure that one or more of the following defects does not exist:

1. **Pinholes** - A small hole or tear in the filter matrix which appears when examined over a light table.
2. **Loose material** - Any loose material or particulate contamination on the filter surface.
3. **Separation of reinforcing ring** - Any separation or discontinuity of the seal between the filter matrix and the outer retaining or reinforcing ring.
4. **Discoloration** - Any visible discoloration that indicates problems during the filter's manufacture or packaging.
5. **Filter non-uniformity** - Any obvious difference in the spatial uniformity of the filter matrix structure or color. Analytical techniques which rely on the uniformity of aerosol deposition (e.g. x-ray fluorescence) are particularly sensitive to filter defects of this type.
6. **Other** - Defined as any other defect (e.g. wrinkling, warping, etc.) which might prevent a filter from providing accurate measurement data.

If any of the above defects are found on a filter prior to sampling, the filter should be discarded and replaced with one of the same manufacturer's lot. Defects detected on a filter during the post-sampling phase of a field study should be noted on the filter's chain of custody record and the defect brought to the attention of the appropriate task leader. The type and severity of the defect will dictate what corrective actions are necessary regarding further use of the filter and interpretation of the filter's test results. For example, a slight postsampling separation of a

Teflon™ filter's reinforcing ring would typically invalidate gravimetric test results but may not adversely effect the quality of X-ray fluorescence analysis performed on the filter's center section. For this reason, post-sampling defects in field filters must be evaluated on a case-by-case basis.

Cleaning and acceptance for nylon filters are described in SOP A-2-2, "Standard Operating Procedure for Cleaning Nylon Filters Used for Collection of PM2.5 Material." Cleaning and acceptance procedures for quartz filters are described in SOP A-6, "Standard Operating Procedure for the Determination of Organic, Elemental, Carbonate, Total Carbon, and OCX2 in Particulate Matter Using a Thermal/Optical Carbon Analyzer."
