13.0 Inspection/Acceptance for Supplies and Consumables

Both field operations and laboratory operations need supplies and consumables. The focus of this section is the management of laboratory and field sampling supplies and consumables. For information on the actual field/lab supplies and consumables needed for any specific method, see the reference method in 40 CFR Part 50[1], the general guidance methods and technical assistance documents on AMTIC[2] and the manufacturer's operations manuals. From this information, monitoring organizations, as part of the QAPP requirements, will develop specific SOPs for its monitoring and analytical methods. One section of the SOPs requires a listing of the acceptable supplies and consumables for the method.

Pollutant parameters are measured using electronic (e.g., continuous emission monitors, FTIRs, etc…), wet chemical techniques, or physical methods. Chemical analysis always involves the use of consumable supplies that must be replaced on a schedule consistent with their stability and with the rate at which samples are taken. Currently used physical methods require adequate supplies of chemicals for operation for three months so that the supplier can comply with the delivery schedules. In some cases, analytical reagents for specific air contaminants deteriorate rapidly and need protective storage. The following information may be helpful when considering the use of these consumable items. Much of the information presented below is derived from the document *Quality Assurance Principles for Analytical Laboratories*[3].

13.1 Supplies Management

Control of supplies and consumables is important to the success of the quality assurance program. It is important that specifications for each item are prepared and adhered to during the procurement process. When specifications are prepared, the following points should be considered: identity, purity, potency, source, tests to be conducted for quality and purity, need for further purification, storage and handling procedures, and replacement dates. As part of supplies management, the following actions are recommended:

- establish criteria and specifications for the important supplies and consumables.
- check and test the supplies and consumables against specifications, before placing them in use.
- design and maintain a supplies management program to ensure the quality of reagents used in day-to-day operations, paying particular attention to primary reference standards, working standards, and standard solutions.
- decide on the kinds of purified water that are necessary, and develop suitable tests and testing intervals to ensure the quality of water used in analytical work and for cleaning glassware.
- purchase only Class A volumetric glassware and perform calibrations and recalibrations that are necessary to achieve reliable results.
- establish procedures for cleaning and storing glassware/sample containers with due consideration for the need for special treatment of glassware/sample containers used in trace analysis.
- establish a useful life for glassware/sample containers and track this.
- discard chipped and etched glassware or damaged containers.

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[1] http://www.access.gpo.gov/nara/cfr/cfr-table-search.html
[2] http://www.epa.gov/ttn/amtic/
[3] Quality Assurance Principles for Analytical Laboratories, 3rd Edition. By Frederick M. Garfield, Eugene Klesta, and Jerry Hirsch. AOAC International (2000). http://www.aoac.org/

13.2 Standards and Reagents

Discussions on gaseous standards and reagents are discussed in Section 12. What is most important is that the standards and reagents used are of appropriate purity and certified within the acceptable limits of the program for which they are used. Table 12-1 provides certification frequencies for gaseous standards, but within these timeframes, and as new cylinders are purchased, monitoring organizations need to develop a standard checking scheme to establish ongoing acceptance of standards. For example a new SRM should be purchased months prior to the expiration (or need for recertification) or complete use of an older standard in order to develop a overlapping cylinder acceptance process so there is some establishment of traceability and consistency in monitoring. For example, if a new SRM is put into use in a monitoring organization and all monitoring instruments traced to the cylinder start failing calibration, it may mean that either the new or older cylinder was not properly certified or has integrity problems. By checking both cylinders prior to new cylinder use, this issue can be avoided.

13.2.1 Standard Solutions

Most laboratories maintain a stock of standard solutions. The following information on these solutions should be kept in a log book:

- identity of solution
- strength
- method of preparation (reference to SOP)
- standardization calculations
- recheck of solution for initial strength
- date made/expiration date
- initials of the analyst
- storage

As mentioned above, all standard solutions should contain appropriate labeling as to contents and expiration dates.

13.2.2 Purified Water

Water is one of the most critical but most often forgotten reagent. The water purification process should be documented from the quality of the starting raw water to the systems used to purify the water, including how the water is delivered, the containers in which it is stored, and the tests and the frequency used to ensure the quality of the water.

13.3 Volumetric Glassware

Use of the appropriate glassware is important since many preparations and analyses require the development of reagents, standards, dilutions, and controlled delivery systems. It is suggested that "Class A" glassware be used in all operations requiring precise volumes. SOPs requiring volumetric glassware should specify the size/type required for each specific operation.

13.4 Sample Containers

Samples may be contaminated by using containers that have not be properly cleaned and prepared (e.g., VOC canisters, particulate filter cassettes/containers) or purchased from vendors without proper inspection prior to use. In addition, all sample containers have a "useful" life. Some containers, such as the low volume PM sample filter cassettes can be damaged over time and cause leaks in the sampling system. It is important to track the inventory of sampling containers from:

- date of purchase;
- first use;
- frequency of use (estimate);
- time of retirement.

An inventory of this type can help ensure new containers are purchased prior to old ones expiring and/or causing sample integrity problems. Use of appropriate sample containers is important since the matter of the container could potentially affect the collected sample. Always refer to the specific method to see if a particular type of container (e.g., high density polyethylene [HDPE] bottles, amber glass) is required for the storage of the sample.

13.5 Particulate Sampling Filters

Filters are used for the manual methods for criteria pollutants (e.g., PM_{10}, $PM_{2.5}$, $PM_{10-2.5}$, total PM, Pb, etc…). No commercially available filter is ideal in all respects. The sampling program should determine the relative importance of certain filter evaluation criteria (e.g., physical and chemical characteristics, ease of handling, cost). The reference methods provide detailed acceptance criteria for filters. Some of the basic criteria that must be met regardless of the filter type follows:

- **Visual inspection -** for pinholes, tears, creases, or other flaws that may affect the collection efficiency of the filter, which may be consistent through a batch. This visual inspection would also be made prior to filter installation and during laboratory pre- and post-weighings to assure the integrity of the filter is maintained and, therefore, the ambient air sample obtained with each filter adequately represents the sampled pollutant conditions.
- **Collection efficiency** - greater than 99% as measured by DOP test (ASTM 2988) with 0.3 micrometer particles at the sampler's operating face velocity.
- **Integrity** - (pollutant specific) measured as the concentration equivalent corresponding to the difference between the initial and final weights of the filter when weighed and handled under simulated sampling conditions (equilibration, initial weighing, placement on inoperative sampler, removal from a sampler, re-equilibration, and final weighing).
- **Alkalinity** - less than 0.005 milliequivalent/gram of filter following at least two months of storage at ambient temperature and relative humidity.

Note: Some filters may not be suitable for use with all samplers. Due to filter handling characteristics or rapid increases in flow resistance due to episodic loading, some filters, although they meet the above criteria, may not be compatible with the model of sampler chosen. It would be prudent to evaluate more than one filter type before purchasing large quantities for network use. In some cases, EPA Headquarters may have national contracts for acceptable filters that will be supplied to monitoring organizations.

13.6 Field Supplies

Field instrumentation, which includes samplers and analyzers, require supplies for the actual collection process as well as quality control activities and crucial operational maintenance. These supplies can include, but are not limited to:

- Gas standards/Permeation standards
- HVAC units
- Maintenance equipment (tools, ladders)
- Safety supplies (first aid kit)
- Information technology supplies (PC, printers, paper, ink, diskettes)
- Sample line filters
- Charcoal
- Desiccant
- Gaskets and O-rings
- Sample lines and manifolds
- Disposable gloves
- Water/distilled water
- Pumps and motors
- Chart paper and ink
- Impaction oil
- TEOM FDMS filter

The site logbook discussed in Section 11 should include a list and inventory of these critical field supplies. As part of routine maintenance activates, this inventory can be reviewed to determine if any supplies are in need of restocking.