

QAM-Q-102

Laboratory Material Acceptance Criteria

Revision 15

Approval:


Laboratory Manager

9-4-20
Date


Concurrence/RSO

9/4/2020
Date

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9-27-22 for 9-5-22 JPM

Texas Institute for Applied Environmental Research

1-27-23 for 9-5-23 JM

QAM-Q-102
Laboratory Material Acceptance Criteria

1. Applicability and Purpose

This procedure applies to all equipment, chemicals, standards and other materials used in the laboratory at the Texas Institute for Applied Environmental Research (TIAER), Tarleton State University, Stephenville, Texas. The purpose of this procedure is to ensure proper acceptance criteria for any material used by laboratory staff in the collection or generation of data. This procedure also provides a method for chemical inventory control. Data quality and personnel safety depend on the use of equipment and chemicals appropriate to the analysis or function being performed. Where specific grades or requirements are not applicable, the higher quality of material usually will take precedence over cost considerations.

2. Definitions

- 2.1. Class "A" volumetric: a piece of glassware, which meets federal criteria for exact volume measurement. The glassware has a capital "A" printed on it.
- 2.2. Type II ASTM water: deionized water, which meets the criteria, set by the American Society for Testing and Materials. Type II water has a maximum specific conductivity of $1.0 \mu\text{mho}/\text{cm}^2$. Better quality water may be used, if available.
- 2.3. ACS or Reagent grade: a level of chemical purity, which is acceptable for analytical use by the American Chemical Society.
- 2.4. NIST traceable: a specific quality of standard that can be traced by documentation back to its source at the National Institute of Standards and Technology.
- 2.5. Certificates of Analysis (COAs): documentation that may accompany standards or reagents provided by the manufacturer, and that describes the quality, purity or grade of the chemical.

3. Equipment, Reagents and Standards

Not Applicable

4. Procedure

QAM-Q-102
Laboratory Material Acceptance Criteria

- 4.1. Upon receipt of materials, inspect the outer packaging for damage during shipment. Significant package damage is reported via a Corrective Action Report (Q-105-1). For radioactive materials, initially screen the container for activity using a pancake probe and Geiger counter in accordance with QAM-RI-101, "Operation and Calibration of the Ludlum Model 3 Survey Meter". Readings above 2 times the background require notification of the Radiation Safety Officer (RSO) and/or Laboratory Manager (LM) prior to continuing with the package. Additionally the package or container is isolated and stored in a shielded area until the surface swipe is complete. Perform a surface contamination swipe of the outer surface of the shipping container and submit to the lab for counting in accordance with SOP-RC-111 "Swipe Testing for Surface Contamination". Swipe readings above 100 dpm/100 cm² require immediate notification of the LM and RSO before proceeding.
- 4.2. Once cleared for visible damage and radioactivity, remove the shipping papers and/or packing list from the outside, if appropriate. These papers are often found inside the package. Check for any special storage conditions listed.
- 4.3. Open the package carefully and remove the contents, inspecting any inner packaging for damage. Inspect the material for damage, missing parts, expiration date, and storage and handling requirements. Compare what was received to the packing list. If all is in order, initial and date the shipping papers as received and forward to the Lab Manager. If the above receipt criteria is not met, the Lab Manager or designee notifies the purchasing agent immediately and note it on the packing list. If the chemical or material is expected for an immediate or special purpose, notify the individual waiting for the material, if known.
- 4.4. Inform the LM of chemicals received or emptied. The LM will complete the Chemical Inventory Log for required information, including expiration date (if present), manufacturer, lot number, and other pertinent information, if present for new chemicals, and disposal date for those emptied or expired. Forward any COAs to the LM. The LM records COA information in the Chemical Inventory which

QAM-Q-102

Laboratory Material Acceptance Criteria

may include the LM file number for easy reference. The Chemical Inventory Log may be a computer managed spreadsheet or database, if it is managed and secured by the Laboratory Manager. For reagents, chemicals and standards, mark the side of the container with the TIAER Inventory ID (generated sequentially from the Chemical Inventory Log, Attachment 1, and provided by the LM), the receipt date and receiver's initials before storage. Circle this number on the container which corresponds with the TIAER ID and traceability data in the electronic inventory log.

- 4.5. When supplies, reagents or standards are received the receiver will attempt to find any necessary COAs from the manufacturer. If they cannot be obtained, the LM is notified.
- 4.6. Chemicals stored in original containers that are not designated by the manufacturer to have an expiration date will not be given one.
- 4.7. If not already labeled, radioactive materials and source standards are given the cyan and magenta colored label "Caution- Radioactive Material". All radioactive calibration sources are entered into the Calibration Sources Log, Q-102-4 (attachment 4). All other radioactive standards, spiking solutions and chemicals are logged into the Chemical Inventory, then Reagents or Standards Logs as appropriate.
- 4.8. Check chemical labels for appropriate grade as ordered. NIST traceable standards are used whenever possible. In the absence of these, the best quality available, usually ACS or reagent grade, is used. ACS or reagent grade materials are acceptable for reagent preparation. Place the material in its proper storage location. Ensure special storage requirements are met (flammable storage, dessicator, etc.)
- 4.9. Upon receipt, inspect volumetric glassware for the capital "A" indicating the correct grade as appropriate. Inspect all glassware for breakage and place in the washing area for use, or on a shelf for stocking purposes.
- 4.10. Reagent water is tested daily, when in use, for Type II compliance in accordance with QAM-Q-103, "Equipment Maintenance" and SOP-C-113, "Determination of Specific

QAM-Q-102

Laboratory Material Acceptance Criteria

Conductance". Refer to the appropriate specific method for individual details.

- 4.11. All standards made in the laboratory, and dilutions thereof, are documented in the Standards Logbook, Attachment 2, Q-102-2. All reagents made in the laboratory are documented in the Reagents Logbook, Attachment 3, Q-102-3. In this way, standards may be traced back to original lot numbers, manufacturer, specifications and receipt when compared to the Chemical Inventory Log, Attachment 1, Q-102-1. All Personal Logbooks and analytical run logs uniquely identify standards and reagents used for traceability to the Standards Logbook and Reagent Logbook, which indicate traceability to the original lot number and manufacturer in the TIAER Inventory ID.
- 4.12. Expiration dates of standards and reagents prepared in the laboratory do not exceed the date of the parent chemical as designated by the manufacturer. If no expiration for preparation is described in the SOP where it is used, no date exceeds 6 months from preparation. Lower concentrations may be limited to shorter expiration dates by the Laboratory Manager (normally not exceeding 3 months, if not described in the analytical SOP). If the SOP states a shorter expiration than described by the manufacturer, the most conservative (shortest) date is used.

5. Quality Control and Safety Aspects

- 5.1. The Laboratory Manager is responsible for ensuring that all materials used in the laboratory for data collection and generation are of acceptable quality and for maintaining COAs where applicable. He/she ensures that appropriate grades of reagents, standards and chemicals are selected and ordered from reputable scientific supply companies in accordance with each individual analytical procedure. The Laboratory Manager or his/her designee is responsible for rotation of chemicals to ensure that older lots are used first and that expiration dates are observed and followed. All orders for radioactive materials are approved by the RSO prior to placing the orders.

QAM-Q-102

Laboratory Material Acceptance Criteria

- 5.2. Material acceptance is performed with this procedure and under guidelines set in QAM-Q-101, "Laboratory Quality Control" and QAM-S-101, "Laboratory Safety".
- 5.3. If materials are received damaged, broken or missing, or past expiration date, a Corrective Action Report (CAR) may be completed in accordance with QAM-Q-105, "Corrective Actions". At the Laboratory Manager's discretion, certain chemicals may be kept past expiration dates as long as they are used only in special circumstances (such as method development), not used for data generation, and are clearly labeled as "EXPIRED", or "NON-NELAC".
- 5.4. When a chemical container is emptied of its contents or opened, the date is entered on its corresponding row in the Chemical Inventory Log, Attachment 1, Q-102-1 by the Lab Manager or designee when notified. It is convenient to first record on the container so that the date is communicated to the LM prior to container disposal.
- 5.5. The LQAO records dilutions and preparations of PT samples in the Standards Log.
- 5.6. The RSO or trained designee is responsible for recording calibration source information when received (Attachment 4).

6. References

- 6.1. Good Laboratory Practice Standards, ed. by Willa Y. Garner, et al., American Chemical Society, Washington, D.C., 1992
- 6.2. Standard Methods for the Examination of Water and Wastewater, latest approved editions, ed. by A. E. Greenberg, et al., APHA, AWWA, Washington, D.C.
- 6.3. Code of Federal Regulations, Title 40, Part 160: Good Laboratory Practice Standards, National Archives, 2012.
- 6.4. 2016 TNI Standard, The NELAC Institute.
- 6.5. University of Wisconsin-Milwaukee Radiation Safety Program.

7. Attachments

- 7.1. Chemical Inventory Log, Q-102-1 (may be Elog)
- 7.2. Standards Logbook, Q-102-2 (may be Elog)
- 7.3. Reagents Logbook, Q-102-3 (may be Elog)
- 7.4. Calibration Source Log, Q-102-4 (Elog)

QAM-Q-102

Laboratory Material Acceptance Criteria

Attachment 1 Chemical Inventory Log example

[illegible]

QAM-Q-102
Laboratory Material Acceptance Criteria

Attachment 2 Standards Logbook (Example)

Date	Time Prepared	SOP #	Source ID	TIAER Inventory ID	Source Expiration Date	Weight Used of Solid Source (g)	Conc. of Liquid Source	Volume Used of Liquid Source (mL)	Final Volume (mL)	Final Conc. (mg/L)	Standard ID	Expir. Date	Initials	Comments

QAM-Q-102-2, rev. 15

QAM-Q-102
Laboratory Material Acceptance Criteria

Attachment 3 Reagents Logbook (Example)

Date Prepared	Time Prepared	SOP#	Source & Supplier	TIAER Inventory ID	Source Expiration Date	Weight Used of Solid Source (g)	Conc. of Liquid Source	Volume Used of Liquid Source (mL)	Final Volume (mL)	Final Volume (mg/L)	Reagent ID	Expir. Date	Initials	Comments

QAM-Q-102-3, rev. 15

QAM-Q-102

Laboratory Material Acceptance Criteria

Attachment 4

Calibration Source Log (example)

Calibration Source Log

Date: 4/16/2016			Half-life Formula		$A_t = A_i \cdot 2^{(-t/h)}$		Out of Service		
Isotope	Original C _o (μCi)	Expected C _t (μCi)	Time(days)	Half-life (days)	Date received	ID	Emission Type	Vendor	Date
Cesium-137	0.5	0.374834	4582	11023	Mar-03	86	Beta,Gamma	Spectrum	
Cesium-137	0.5	0.374834	4582	11023	Mar-03	85	Beta,Gamma	Spectrum	
Cesium-137	0.5	0.374834	4582	11023	Mar-03	71	Beta,Gamma	Spectrum	
Polonium-210	0.1	0.005933	564	138.4	Mar-14	P1	Alpha	Spectrum	
Polonium-210	0.1	0.032082	227	138.4	Feb-15	P2	Alpha	Spectrum	
Polonium-210	0.1	0.005933	564	138.4	Mar-14	P3	Alpha	Spectrum	
Strontium-90	0.1	0.096349	564	10512	Mar-14	S1	Beta	Spectrum	
Barium-133	1	0.903025	564	3832.5	Mar-14	B1	Gamma	Spectrum	
Cobalt-60	1	0.816085	564	1923.55	Mar-14	C1	Beta,Gamma	Spectrum	

Q-102-4, rev. 15