

QA/QC PLAN - Analytical Solution, Inc.

This document outlines the quality control procedures and components that are mandatory in the performance of analyses in the laboratories of Analytical Solution, Inc. (AnSol) at Willowbrook, Illinois.

Quality Assurance Programs and Objectives

Quality assurance programs are devised to continually monitor the reliability (accuracy and precision) of the results reported and to control of quality to meet the client's requirement of reliability.

Organization and Responsibility

A QA team is established including data reviewers, a QA manager and the laboratory director. The QA team is responsible for all aspects of quality work, including monitoring and corrective action. The laboratory director assumes full responsibility for the reliability of the analytical results submitted. The laboratory director also assumes full responsibility in both design and implementation for the quality assurance program.

Sample Custody and Information

Sample integrity and representativeness are essential to the total quality of testing, although field sampling is often beyond the control of the QA team within the laboratory. A Chain of Custody (COC) form with complete sample information and tests requested must be submitted by the requestor. Samples must be labeled and sample information accurately documented for ready access. AnSol has developed written procedures for gas sampling to assist our client collecting good samples in the field for the objective of total quality control.

Analytical Methods

Standard methods from standard-setting institutes, such as ASTM, EPA, GPA, API and OSHA, are normally adopted and modified as necessary for use in our laboratory, if they are available for specific testing. The methodology is carefully documented with modifications and deviation from standard methods. Each analytical method has a rigid protocol with associated QC procedures.

AnSol developed many own advanced analytical methods for special testing. These non-standard procedures are documented in a standard format with scope and application, principle, equipment, reagents, procedure, calculation of results, and expected precision and accuracy.

Chemicals, Reagents and Specialty Gases

Only chemicals and specialty gases meeting the quality specifications cited in analytical methods are utilized for testing. A host of gas standards are available for calibration. Certified gas standards with valid date are employed as primary standards. Working standards with known concentrations are used as secondary standards. Continual cross calibration among primary and working gas standards are enforced to assure the quality of each standard with traceability.

Instruments and Maintenance

All instruments and equipment, mainly Gas Chromatograph, are installed and maintained as specified by the manufacturer. A log of GC columns is maintained with traceable calibration information to assure the quality of each GC column for intended GC separation and detection.

Calibration Procedures and Frequency

Calibration of Gas Chromatograph is mandatory every day for the intended test. Procedures are cited in standard methods using required gas standards. Calibration consists of confirmation of retention time (RT) and response factors (RF) for each compounds of interest.

Data Reduction, Validation and Reporting

Raw data from instrument measurement are normally translated to qualitative and quantitative information using data acquisition and management system available to the instrument. Manual data handling, such as GC peak integration, is absolutely necessary to obtain accurate data. Special spreadsheets are written to translate data to analyte concentrations with parameter input and self checking routines. Result validation includes quality control checks performed during the testing, knowledge-based confirmation, and historical data verification. The report is finalized with multiple review.

Quality Control Check and Performance Audits

Standard quality control check may include the following;

- System zero check (without injection) – a minimum of once daily
- System blank check (without sample, with UHP N₂ or He) – a minimum of once daily
- Calibration standards and control samples for RT and RF verification - everyday
- Calibration curve verification and update - everyday
- Duplication for repeatability - once every 20 samples and at least once every day
- Control chart for accuracy and precision.
- Interlaboratory performance evaluation

Analyze reference-type samples to provide independent checks on the analytical system. The results should fall within the routine limits of each laboratory for a standard at a level comparable to the specified true value. Participate in performance evaluation and method studies as available from EPA, from the American Society for Testing and Materials, and from other agencies.

References:

1. Handbook for Analytical Quality Control in Water and Wastewater Laboratories, EPA 600/4-79-019
2. Interim Guidelines and Specifications for Preparing Quality Assurance Project Plan, EPA-600/4-83-004, NTIS, PB83-170514
3. Quality Control in Analytical Chemistry, G. Kateman and F. W. Pijpers, Volume 60 in Chemical Analysis, John Wiley & Sons

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