



Appendix A2

Requirements for Laboratories Approved for Testing: Process Solution Control

1. INTRODUCTION

- 1.1. This document identifies the minimum requirements for the operation and control of a testing laboratory that supports Boeing D1-4426 approved processes. This is to be used as the requirements document for approval to Process Code 809.
- 1.2. This document is a supplement to D1-4426 and the associated specifications. All requirements in D1-4426 and the applicable specifications shall be met.

2. LIMITATIONS

- 2.1. These requirements are limited to laboratories approved per D1-4426.
- 2.2. These requirements are to be used in support of required testing only for processes listed in D1-4426.
- 2.3 This document does not override any process specifications. In the case of conflict between a specification and this document, the specification has precedence.

3. SCOPE

Not applicable to this appendix.

4. GENERAL REQUIREMENTS

- 4.1. If the laboratory is independent of a manufacturing or production facility, a basic Quality System meeting the requirements of Section 7 of the "Processor Quality Management System (QMS) Requirements" section of the D1-4426 web page is required.

Note: This checklist does not override any process specifications. In the case of conflict between a specification and this document, the specification has precedence.

- 4.2. Applicable referenced specifications are available and current.

- 4.3. Supplier shall develop and maintain documented procedures and parts are processed to these procedures.
- 4.4. Detailed test procedures for all types of evaluation and analysis performed at the laboratory shall be developed and implemented based on specification requirements, manufacturer's recommendations, or published reference guides. This includes sample size, reagents, equipment, procedure, calculations, etc.
- 4.5. Procedures shall contain provisions for timely notification in accordance with contractual requirements of the customer or requesting division when results are out of the referencing specification's stated tolerances.
- 4.6. The processor shall have documented procedure(s) which detail how invalid, re-tests, and replacement tests are controlled and documented. In addition, the procedure will detail how re-tests are accomplished whenever a non-conforming test value is found and ensure investigations occur in order to determine the reasons for previous failures and/or product impact.

Note: A replacement test is a test performed based on the original test whose results are considered to be invalid because of identified causes other than the properties of the material being tested (e.g., errors in specimen machining or testing or failure at incorrect location).

- 4.7. Samples shall be positively identified throughout all stages of evaluation.
- 4.8. The laboratory shall develop and maintain a documented employee safety plan and appropriate safety equipment shall be available in accordance with that plan, (i.e. Safety glasses, fume hoods, showers, eyewash, Fire Blankets, etc.). Employees shall be trained in the safety plan; and objective evidence of employee training shall be maintained by employer and available upon request.

5. PERSONNEL

- 5.1. Laboratory personnel performing testing or evaluation shall possess formal, documented education in the appropriate subject(s), or have documented training and verification of skill to perform their tasks.
- 5.2. Personnel shall have annual performance reviews to verify the accuracy and repeatability of their technique, the results being reported and to ensure they are familiar with chemicals, equipment and procedures for use. At a minimum, the review shall document the following:
 - The individual's historic process testing results
 - The individual's results against others in the facility performing the same tests, if applicable
 - The individual is tested against known standards

5.3. Periodic vision examinations for laboratory Technician personnel shall assure that the applicant's near vision and color perception meet the following requirements. Methods of verification equivalent to the following values can be made by comparable ophthalmologic methods (LogMAR chart, Pseudo-Isochromatic Plates, etc.).

- Near Vision - 20/25 (Snellen) at 16" (42 cm) +/- 1" (2.54 cm) or equivalent in at least one eye, natural or corrected.
- Color Perception - Personnel shall be capable of adequately distinguishing and differentiating colors used in the process involved (e.g. titrations).

5.3.1. Near vision tests shall be administered and color perception tests shall be administered at defined intervals which ensure personnel are capable of properly performing the assigned work.

- These tests shall be administered by qualified medical personnel or by company designated trained & qualified personnel.
- Vision test results and evidence of designated training for qualified medical personnel shall be made available to Boeing for review upon request.
- When vision correction is necessary to pass the visual acuity exam, vision correction shall be worn during all testing/inspections. Any limitations in color perception must be specified and approved in writing.

6. DOCUMENTATION

6.1. A traceable lab report/record shall be issued which contains:

- Date of report
- Unique identification number
- Tank number or ID
- Tests or evaluations performed
- Specification reference(s) as applicable
- Specification values / tolerances as applicable
- Results (with appropriate units of measurement)
- Chemical additions as applicable for solutions
- Technician identification or signature and date of test

6.2. Out-of-Specification conditions must be immediately communicated to the affected people. (Internal division or other company).

6.3. Lab records shall be retained in good condition for a minimum of 10 years in a manner that allows retrieval within twenty four hours or in the event records cannot be retrieved within Twenty four hours the duration is negotiated between the processor and the affected customer.

7. PROCESS SOLUTION CONTROL – Process Code 809

7.1. General Equipment Requirements

7.1.1. A documented procedure is required which details all calibration requirements and frequencies for lab equipment, such as Thermometers, Analytical Balances, Test Standards, etc. Procedures must include recalibration after major rework or repair, and require “As Found – As left data” data.

7.1.1.1 Procedures must clearly address when the as found condition is identified as being out of tolerance, the use of the equipment, and the potential impact on the reading obtained from it back to the last acceptable calibration.

7.1.2. The calibration procedure shall include a review of external source procedures calibration of lab equipment to ensure the calibration process in accordance with ISO/IEC 17025, NQA-1, DOE O 414, ANSI/NCSL Z540-1 or recognized equivalent.

7.1.3. Evidence of traceability to NIST standards or other known physical constant, shall be required and available for all testing equipment and reference standards. (For example freezing or boiling points of water).

7.2. Lab ware

7.2.1. Laboratory glassware shall be maintained clean atmosphere, and must be free of salts and other contamination.

7.2.2. All analytical lab ware shall be Class A or B and marked TD "to deliver" or marked per the technique type used.

7.2.3. Pipettes and burettes must be maintained in good physical condition, with complete tips, not broken or scratched, and have legible markings.

7.2.4. When fluoride analysis is performed, plastic ware must be used.

7.3. Chemical Storage

7.3.1. Chemicals must be stored in a fashion to allow for separation based upon chemical compatibility such as bases versus acids, cyanides, perchlorates etc.

7.3.2. Light sensitive reagents shall be stored in dark bottles or wrapped in aluminum foil such as silver nitrate, sodium thiosulfate, etc.

7.3.3. Mild radioactive reagents such as thorium nitrate must be marked appropriately with the correct protective measures taken.

7.3.4. Flammables must be stored in appropriate OSHA (USA) or other recognized international equivalent approved containers, in and flammable cabinets and labeled as required.

7.3.5. All titrants/reagents shall be labeled per OSHA (USA) or other recognized international equivalent requirements to include chemical name and concentration, as well as expiration date and technician's name as applicable.

7.3.6. All other solutions must be stored in a manner that ensures concentration stability, or are periodically replaced.

7.4. Analytical Procedures

7.4.1. Solutions used for analysis shall have known concentrations to three decimal places as verified by Certifications, except for solutions such as buffers.

7.4.2. Solutions made up by laboratory personnel are required to have standardization procedures using analytical solutions which have known concentrations to three decimal places as verified by Certifications.

7.4.3. Samples shall be taken under the same condition as parts are processed (i.e. agitation or no agitation).

Note: Unless prohibited by applicable specification agitation and maintaining solutions at proper working levels is required.

7.4.4. QA verification techniques such as "spike and percent recovery", AA (atomic absorption) verification, or other suitable means are required to be used on a periodic basis to verify laboratory results.

Note: The "In House" laboratory must have a documented analytical schedule to show when sampling, analysis/process control testing is to be accomplished.

7.4.5. All solution parameters required by specification must be analyzed on a frequency to assure that parameters stay within specification ranges unless otherwise required by specification.

7.4.6. New tanks or solutions, which are out of specification range, must be reanalyzed after chemical addition and prior to use by production.

Note: See section 4.4 for expectations.

7.4.7. Chemical additions shall be made in a timely manner, the addition shall be documented including identification of who made the addition, and when the addition was made.

- 7.4.8. PH meters must be standardized prior to use with certified buffer solutions per the equipment manufactures recommendations.
- 7.4.9. When performing calibration, buffer solutions are required to bracket the pH ranges to be measured.
- 7.4.10. When gravimetric analysis is performed, crucibles shall be weighed using a four decimal place balance (0.1 mg), a drying oven employed and quantitative transfer techniques utilized.
- 7.4.11. If Kokour tubes are used for sulfate analysis, they must be thoroughly cleaned in accordance with a procedure specific to the use of the centrifuge employed.

Revision Date	Revision
1-April-2019	New section: 2.3., 7.1.1.1 Updated sections: 4.1., 4.4., 4.5., 4.6., 5.1., 5.3.1, 6.2., 7.4.8, 7.4.9 Deleted sections: 7.2.5
7-May-2020	Updated section 5.3 & 5.3.1