

FAA GUIDANCE

Contractor Quality Control

SWIFT

September 19 - 22, 2016
Minneapolis, Minnesota

Greg Cline, FAA AAS-100
gregory.cline@faa.gov
(202) 267-8814



Federal Aviation
Administration



Presentation Objectives

- **Summarize work in Airports Safety & Standards, Airport Engineering Division (AAS-100)**
- **Brief Overview of Advisory Circular 150/5370-12B Quality Management for Federally Funded Airport Construction Projects**
- **Summarize Requirements for Contractor Quality Control Program**



FAA Role in Pavements in USA

- Airport's Individually Owned / Operated
- FAA Certification for Commercial Operations “49 CFR Part 139”
- FAA Administers a Grant in Aid Program
 - ~ 3.2B (US) (FY 2015)
 - ~ 1.7 B (US) Pavements (~60% of AIP)



Airports in US

FAA generally limited to NPIAS Facilities
(National Plan Integrated Airport System)

Type of Facility	Total U.S. Facilities	Private-Use Facilities	Public-Use Facilities	Existing NPIAS Facilities
Airport	13,112	8,266	4,857	3,283
Heliport	5,579	5,513	66	10
Seaplane Base	488	272	216	38
Balloonport	13	12	1	
Gliderport	35	30	5	
Ultralight	122	119	3	
Total	19,360	14,212	5,148	3,331⁵



Commercial Service Airports in US

Category	No.	Passengers
Commercial Service	506	At least 2,500
Primary	394	> 10,000
Large Hub	30	1% or more
Medium Hub	33	.25% < 1%
Small Hub	71	.05% < .25%
Non	260	> 10,000 < .05%
Part 139 Cert.	541	



Airport Pavements in US

Paved Areas (NPIAS Airports)

	AREA (millions sy)	AREA (millions sq m)	~14' wide Lane Mile
RW	273	228	~33,000
TW*	105	88	~13,000
Apron**	81	68	~10,000
Total	460	385	~56,000

* TW Area estimated at 38.6% of RW

** Apron Area estimated at 29.8% of RW

**NOTE: FAA tracks and reports Paved Runway Conditions of all NPIAS Airports
(~ 4410 Runways in the ~3280 NPIAS Airports)**



Federal Aviation
Administration

Airport Engineering Division AAS-100

- Division Manager
- Deputy Division Manager
- Secretary / Administrative Assistant
- National Resource Expert on Air Space
- 7 Civil Engineers [2 Pavements Engineers]
- 4 Electrical/Electronics Engineers
- 2 ACRP (1 Engineer; 1 Program Analyst/Engineer)
- 3 Airports GIS (1 Computer Scientist; 2 Data Analyst)
- Airport Safety Data Program [Program Manager]
- Technical Support Contractor



FAA HQ AAS Activities

- **Standards and Guidance**

- Advisory Circulars (ACs) / Engineering Briefs (EBs)
- CertAlerts

- **Engineering Standards**

- Airport/Heliport/Seaplane Base Design and Construction
- • Pavement Design and Management
- Lighting, Marking, and Signs
- New Technology / Research & Development (R&D)
- Airports Geographic Information Systems (GIS)

- **Safety and Operations**

- Part 139 Certification Program
- Aircraft Rescue and Fire Fighting
- Wildlife Hazard Mitigation



FAA Guidance

- FAA guidance is part of the authorizing legislation for airport development using Federal funds.
- FAA airport design, construction, and maintenance guidance are contained in Advisory Circulars, the 150's series.
- Interim FAA airports engineering guidance is provided in Engineering Briefs.
- FAA airport guidance is available from FAA web sites : <http://www.faa.gov/arp/>



Airports Web Site



http://www.faa.gov




Federal Aviation
Administration

FAA Pavement Advisory Circulars

http://www.faa.gov/airports/resources/advisory_circulars/

Series 150 Advisory Circulars (ACs) for Airport Projects

 Print

Search Content, Number, Title, Description, or Office

Topic: All

Status: Current

Or can just do a search engine query for AC, e.g. AC 150/5370-10



Pavement Advisory Circulars

Advisory Circular	Title
AC 150/5370-10G * 2014	Standards for Specifying Construction of Airports
AC 150/5320-6E * 2009	Airport Pavement Design & Evaluation
AC 150/5335-5C 2014	Standardized Method of Reporting Airport Pavement Strength (PCN)
AC 150/5320-5D 2013	Surface Drainage Design
AC 150/5320-12C * 1997 (updates through 2007)	Measurement, Construction & Maintenance of Skid Resistant Airport Pavement Surfaces
AC 150/5340-1L * 2013	Standards for Airport Marking
AC 150/5370-11B * 2011 (To be incorporated into 5320-6 in FY16)	Use of Non Destructive Testing in the Evaluation of Airport Pavements
AC 150/5380-6C 2014	Guidelines & Procedures for Maintenance of Airport Pavements
AC 150/5380-7B 2014	Airport Pavement Management Programs (PMP)
AC 150/5370-12B 2015 (Combined 5370-12, 5370-6, 5300-9)	Quality Management for Federally Funded Airport Construction Projects
5320-17A 2014	Airfield Pavement Surface Evaluation and Rating Manuals
5370-14B 2013	Hot Mix Asphalt Paving Handbook
5000-15B 2013	Announcement of Availability of Airport-Related Research and Development Products



FY 16 & FY 17 Updates & Changes to Pavement Advisory Circulars

AC 150/5320-6F Airport Pavement Design

- Currently in Review process
- FAARFIELD V 1.41 (V 2.0 in 5320-6G)
- Updated Figures
- Consolidated Information on minimums
- Incorporate NDT as appendix

AC 150/5370-10H Standards for Specifying Construction of Airports

- Reformat & Editing throughout
- New Item for Construction Quality Control
- Other new Items



Pavement Computer Programs

Software	Description
FAARFIELD v 1.305* (v 1.41.001 FY 16)	Airport Pavement Design
COMFAA 3.0	PCN/ACN
COMFAA 3.0 Support	Excel Spreadsheet to assist with PCN evaluation (development of reference section)
BAKFAA	Back-calculation of modulus from NDT testing
FAA PaveAir	FAA Pavement Management Software
PWL Spreadsheet	Asphaltic Concrete Payment Adjustments for Densities and Air Voids
Downloads	http://www.airporttech.tc.faa.gov/naptf/download/index1.asp#soft

**Note minor updates to programs periodically posted
Be sure to check that you are using the latest version**



Federal Aviation
Administration

Brief Overview of Advisory Circular 150/5370-12B

Quality Management for Federally Funded Airport Construction Projects



Federal Aviation
Administration



Advisory Circular 150/5370-12B

OVERVIEW

5370-12

Topic: All

Status: Current

Search

1 result

Export (CSV)

Number	Office	Title	Date
150/5370-12B	AAS-100	<p>Quality Management for Federally Funded Airport Construction Projects</p> <p>This advisory circular (AC) provides information on the planning and oversight of construction projects at airports accomplished under the FAA's Airport Improvement Program (AIP). In addition to the previous version, this AC cancels:</p> <ul style="list-style-type: none">• AC 150/5300-9B, <i>Predesign, Prebid, and Preconstruction Conferences for Airport Grant Projects</i>• AC 150/5370-6D, <i>Construction Progress and Inspection Report-Airport Improvement Program (AIP)</i>• 150/5370-12B - (PDF, 636 KB)• Sample Construction Management Program - (PDF, 540 KB)	09-14-2015



Federal Aviation
Administration

Advisory Circular 150/5370-12B

OVERVIEW

Combined and cancelled information from:

AC 150/5370-12A Quality Control of Construction for Airport Grant Projects

AC 150/5300-9B Predesign, Prebid and Preconstruction Conferences for Airport Grant Projects

AC 150/5370-6D Construction Progress and Inspection Report-Airport Improvement Program (AIP) / FAA Form 5370-1, Construction Progress and Inspection Report

Quality Management for Federally Funded Airport Construction Projects



Federal Aviation
Administration

Advisory Circular 150/5370-12B

Chapter 1. Responsibilities

Sponsor's Responsibilities

All project engineering, including the preparation of plans and specifications, construction supervision, and inspection and testing for acceptability and quality

Engineering Services

AC 150/5100-14, Architectural, Engineering, and Planning Consultant Services for Airport Grant Projects

Predesign, Prebid, and Preconstruction Conferences [Chapter 2] Construction Safety and Phasing Plans (CSPP)

AC 150/5370-2, Operational Safety on Airports During Construction

Supervision and Inspection

Refer to AIP grant Assurance No. 17, Construction Inspection and Approval



Advisory Circular 150/5370-12B

Chapter 1. Responsibilities

Sponsor's Responsibilities (continued)

Construction Management Program (CMP)

Minimum requirements for a CMP are given in Appendix A

Refer to Order 5100.38, Airport Improvement Program Handbook, for further eligibility guidance on the CMP

The CMP is a separate document from the contractor's quality control program required by AC 150/5370-10, Section 100

Construction Progress Reports

FAA Form 5370-1, Construction Progress and Inspection Report (Appendix B)

Final Inspection

Construction Final Report

Sponsor Certification



Federal Aviation
Administration

Advisory Circular 150/5370-12B

Chapter 1. Responsibilities

Engineer's Responsibilities

The basic services normally required for airport development projects include the preliminary design phase, design phase, bidding phase, and construction phase.

AC 150/5100-14, Architectural, Engineering, and Planning Consultant Services for Airport Grant Projects, identifies activities normally performed during phases.

Design Phases

Complete project design, including development of plans and specifications

AC 150/5370-10, Standards for Specifying Construction of Airports

Minimum testing frequency for quality assurance (QA) and quality control (QC) must be specified

Construction Phase

All activities required after the award of a construction contract

Normally include periodic inspection of the work in progress by the design engineer

Special services of an engineering agreement will address the requirements for inspection and QA testing



Advisory Circular 150/5370-12B

Chapter 1. Responsibilities

FAA Program/Project Manager's Responsibilities

Monitor the project to ensure the terms and conditions of the grant agreement are met,
Maintain a broad overview of the construction to be reasonably certain the work is accomplished in accordance with the plans and specifications,
Evaluate the adequacy of the sponsor's construction inspection and oversight.

FAA project oversight does not relieve the sponsor of responsibility to ensure adequate supervision and inspection during all stages of the work and that the work is in conformance with the plans and specifications

FAA program/project manager oversight responsibilities are outlined in Order 5100.38, Airport Improvement Program Handbook



Advisory Circular 150/5370-12B

Chapter 2. Predesign, Prebid, and Pre-construction Conferences

Predesign Conference

Prebid Conference

Pre-construction Conference

Purpose

Timing A minimum of 10 working days advance notice is recommended

Participants

Agenda Items

Appendix C

Typical agenda items include unusual features of the project; explanation of the contract requirements and construction methods and procedures; discussion of construction safety and phasing requirements; and review of the federal/state/local procurement process

Appendix D



Federal Aviation
Administration

Advisory Circular 150/5370-12B

Appendix A. Minimum Requirements for Construction Management Programs (CMP)

Who: Sponsor must submit CMP to the FAA

When: Prior to the start of construction

Pavement const. contract value > \$500,000

< \$500,000 if desire of sponsor or required by FAA

What: A CMP is to detail the measures and procedures to be used to comply with the quality assurance provisions including, but not limited to, all quality assurance provisions and tests required by the federal specifications

A CMP must include as a minimum

How: Sample CMP and Submittal Register

http://www.faa.gov/regulations_policies/advisory_circulars/index.cfm/go/document.current/documentNumber/150_5370-12




Federal Aviation
Administration

Advisory Circular 150/5370-12B

Appendix B. FAA Form 5370-1, Construction Progress and Inspection Report

Form available at
<http://www.faa.gov/airports/resources/forms/>

OMB CONTROL NUMBER: 2120-0569
EXPIRATION DATE: 4/30/2017

 U.S. Department of Transportation Federal Aviation Administration		Construction Progress and Inspection Report		Period Ending
		Airport Grant Program		Project Number
Airport Name				
Project Description			Contractor's Name	
1. Contract Time	No. Days Charged to Date	Last Working Day Charged (Date)		
2. Brief Weather Summary this Period, including Approximate Rainfall and Periods of Below Freezing Temperature (On earthwork jobs, include soil conditions.)				
3. Rough Estimate of Percent Completion to Date of Construction Phase. (Include items such as clearing, grading, drainage, base, surface, lighting, etc.)				
4. Work Completed or In Progress this Period				
5a. Summary of Laboratory and Field Testing this Period. (Note failing tests and any retests. Summarize out-of-tolerance.)				
5b. Material (Identify material subject to pay reduction.)				
6. Description of Anticipated Work by Contractor for Next Period				
7. Problem Areas/Other Comments (Include revisions to plans and specifications approved or denied, delays, difficulties, etc. and actions taken.)				
SPONSOR'S INSPECTOR OR REPRESENTATIVE				
Date	Typed or Printed Name and Title		Signature	

FAA Form 5370-1 (4/15) SUPERCEDES PREVIOUS EDITION



Federal Aviation
Administration

Advisory Circular 150/5370-12B

Appendix C. Sample Agenda Items for a Predesign Conference

This list is not all inclusive and
may be modified as necessary

9/14/2015

AC 150/5370-12B
Appendix C

APPENDIX C. SAMPLE AGENDA ITEMS FOR A PREDESIGN CONFERENCE

This list is not all inclusive and may be modified as necessary.

1. Design Phase.
 - o Scope of work and design parameters peculiar to the project, including items such as design aircraft, local conditions and materials, use of recycled materials, design options, use of FAA standards, and materials furnished by others.
 - o Review the airport layout plan (ALP) and the scope of project in the airport capital improvement plan (ACIP).
 - o Funding.
 - o Discussion of engineering fees.
 - o Reimbursable agreements (FAA owned NAVAIDS).
 - o Identification and impacts to existing NAVAIDS and instrument approach procedures.
 - o Flight check requirements.
 - o Airspace requirements.
 - o DBE requirements.
 - o Federal wage rates.
 - o FAA contract provisions.
 - o Buy American requirements.
 - o Construction Management Program (CMP) requirements.
 - o Plan and specification review.
 - o SMS and ATC coordination.
 - o AGIS requirements.
 - o Identification and location of underground utilities within project limits.
 - o Requirements for the engineer's report.
 - o List of applicable design standards.
 - o Development of the construction safety and phasing plans (CSPP).
 - o Pavement design and alternatives with supporting geotechnical reports and FAARFIELD structural analysis.
 - o Drainage design.
 - o Lighting design.
 - o Pavement marking and airfield signage;
 - o Environmental considerations including stormwater management.
 - o Modifications to design standards and construction specifications.
 - o Description of non-federally funded work to be included in the contract.
 - o Engineer's estimate of construction contract cost.
 - o Project budget and schedule.
 - o Other.
2. Construction Phase.
 - o Sequence of construction phases and any necessary special routing of aircraft considering airline schedules.
 - o Work limits.
 - o Time needed for clearance of runway, taxiway, or apron by construction equipment prior to reopening.
 - o Notification of schedule changes.
 - o Airport operations area security concerns.
3. Operational Safety.
 - o Development of the CSPP in accordance with AC 150/5370-2 and incorporation into the plans and specifications.]



Federal Aviation
Administration

Advisory Circular 150/5370-12B

Appendix D. Sample Agenda Items for Preconstruction Conference

This list is not all inclusive and may be modified as necessary

APPENDIX D. SAMPLE AGENDA ITEMS FOR PRECONSTRUCTION CONFERENCE

This list is not all inclusive and may be modified as necessary.

1. Identify main points of contact.
 - o Owner, owner's representative, contractor, superintendent, resident engineer, etc.
 - o Identify roles and responsibilities.
 - o Discuss authority of engineer.
 - o Relationship between FAA and sponsor.
2. Scope of Work.
 - o Include general plan or chart to depict proposed work.
 - o Proposed schedule of work.
 - o Identify construction phasing concerns.
3. Notice-To-Proceed. Contingent upon:
 - o Execution of grant agreement.
 - o Execution of contract and required bonds.
 - o Sponsor acceptance of DBE participation.
 - o FAA approval of waiver to Buy American preferences (if applicable).
 - o FAA approval of construction management program.
4. Operational Safety and Security:
 - o Safety plan compliance document.
 - o Delineation of construction limits.
 - o Runway and taxiway safety area limits (open trenches, drop offs, irregular surfaces).
 - o Potential impacts to airport operations.
 - o Operational safety requirements of approved CSPP (AC 150/5370-2).
 - o Vehicular operation within the airport operations area with emphasis on runway incursions.
 - o Staging area location and haul route limitations.
 - o Stockpile limitations and Part 77 notification (FAA Form 7460-1, *Notice of Proposed Construction or Alteration*).
 - o Equipment heights and Part 77 notification (FAA Form 7460-1).
 - o Foreign Object Debris (FOD) control (windblown and tracked-on).
 - o Temporary markings and barricades.
 - o Airfield security requirements.
 - o Non-compliance consequences (Removal, suspension of work, etc.).
5. Part 139 Issues.
 - o Vehicle operator/pedestrian training.
 - o Impacts to airport rescue and fire fighting (ARFF) operations and response time.
6. NOTAMS.
 - o Airport operator issued Notice to Airmen (NOTAMs).
 - o Facility outages: 7-day advance notification to FAA Technical Operations.
 - o Procedure NOTAMs: Cannot be issued by Flight Service Station. Contact project manager 7 days prior.
7. FAA Technical Operations (Airway Facilities).
 - o FAA facility outages: 7 day advance notice required.
 - o Location of buried cables.
8. Construction Management Program.
 - o Identify contractor's and sponsor's laboratory.
 - o Acceptance testing versus quality control testing.
 - o Test reports, record keeping, daily diary.
9. Project Submittals. Approval based upon:
 - o Technical requirements.
 - o Buy American Provisions (Origin of Manufacture).
 - o Approved lighting equipment (Appendix 3 of AC 150/5345-53, *Airport Lighting Equipment Certification Program*).
10. Labor Requirements.
 - o Davis Bacon wage rates (Must be posted on conspicuous project board).
 - o Labor poster (Must be posted prior to start of work).
 - o Submittal of payrolls.
 - o Wage rate interviews.
11. Civil Rights/DBE Requirements.
 - o Advise contractor that project is subject to the equal employment opportunity (EEO) clause.
 - o EEO posted notices must be posted prior to start of work.
 - o Sponsor monitoring of DBE.
 - o DBE fraud indicators.
12. Contract Modification Process.
 - o Refer to region guidance.
 - o Sponsor may not seek reimbursement for change order work until FAA approves AIP participation in the change order.
13. Utilities.
 - o Locating.
 - o Protection of FAA cables.
14. Environmental Issues.
 - o Storm water permitting.
15. Waste Disposal.



Federal Aviation
Administration

Summarize Requirements for Contractor Quality Control Program



Federal Aviation
Administration



FAA AC 150/5370-10G STANDARD FOR SPECIFYING CONSTRUCTION OF AIRPORTS

The screenshot shows a PDF viewer window displaying the cover page of FAA Advisory Circular 150/5370-10G. The window title is 'File Scan Edit View Document Comments Pages Tools Favorites Window Connections Help'. The left sidebar shows a table of contents with sections like 'Part 1 - General Provisions' and 'Part 2 - Earthwork'. The main content area features the FAA logo, the text 'U.S. Department of Transportation Federal Aviation Administration', and the title 'Advisory Circular'. Below this, the subject, date, and initiation information are listed.

U.S. Department of Transportation
Federal Aviation Administration

Subject: Standards for Specifying Construction of Airports **Date:** 7/21/2014 **AC No:** 150/5370-10G
Initiated by: AAS-100 **Change:**

1. Purpose. The standards contained in this advisory circular (AC) relate to materials and methods used for the construction on airports. Items covered in this AC include general provisions, earthwork, flexible base courses, rigid base courses, flexible surface courses, rigid pavement, fencing, drainage, turf, and lighting installation.

2. Application. The Federal Aviation Administration (FAA) recommends the guidelines and specifications in this AC for materials and methods used in the construction on airports. In general, use of this AC is not mandatory. However, use of this AC is mandatory for all projects funded with federal grant monies through the Airport Improvement Program (AIP) and with revenue from the Passenger Facility Charge (PFC) Program. See Grant Assurance No. 34, Policies, Standards, and Specifications, and PFC Assurance No. 9, Standards and Specifications.



Federal Aviation
Administration

AC 150/5370-10G, Section 100

Contractor Quality Control Program

The intent of this section is to encourage the Contractor to establish a level of control that will:

- Adequately provide for the production of acceptable quality materials.**
- Provide sufficient information to assure both the Contractor and Engineer that specification requirements can be met.**
- Allow the Contractor as much latitude as possible to develop their own standard of control.**



Section 100

Contractor Quality Control Program

Contractor Quality Control

- Program not same as Construction Management Program (CMP) required by Grant Special Conditions
- Major Projects require on site QC Manager

Paving projects Preconstruction Workshop

- Required when >\$500K
- Engineer, Contractor, Subs, Testing laboratories, Owner (& FAA if available)
- QC/QA Requirements of Specification
- Acceptance Testing By Engineer



Contractor Quality Control Program

100-01

“The quality control requirements contained in this section and elsewhere in the contract technical specifications are in addition to and separate from the acceptance testing requirements. Acceptance testing requirements are the responsibility of the Engineer.”

- QC requirements are in this section ~and~ elsewhere in the specifications
- QC requirements are in addition to and separate from Acceptance Testing requirements



Contractor Quality Control Program

100-02

Components Required as Part of the QC Program

- **Description Of Program**
- **Quality Control Organization**
- **Project Progress Schedule**
- **Submittals Schedule**
- **Inspection Requirements**
- **Quality Control Testing Plan**
- **Documentation of Quality Control Activities**
- **Corrective Action Requirements**



Federal Aviation
Administration

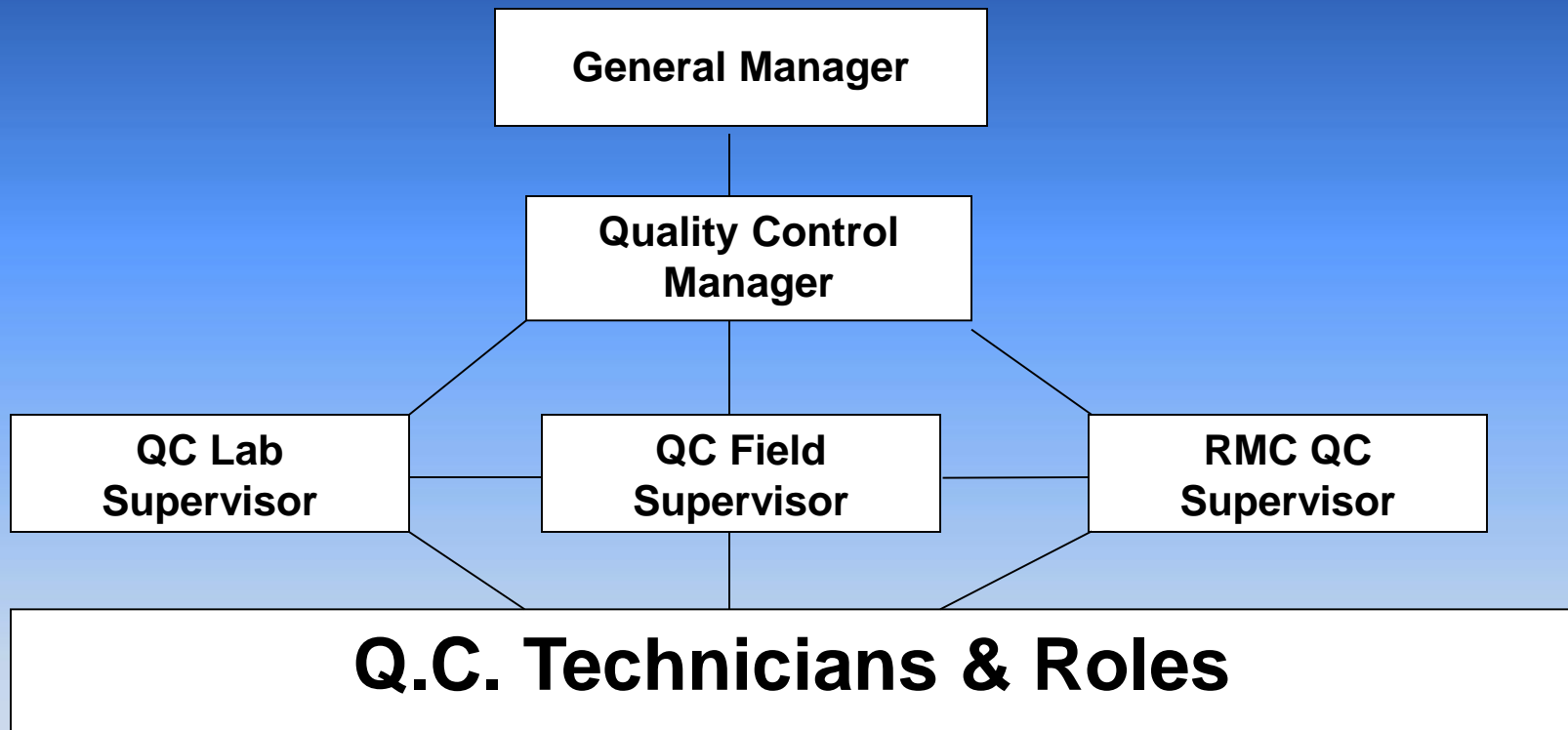
Contractor Quality Organization

100-02

- **Separate quality control organization**
- **QC personnel & integration with management / production / construction**
- **Identify QC staff by name & function**
- **Shall indicate number of staff to implement all elements of the QCP**
- **All QC staff shall meet the qualification requirements of 100-03a & 100-03b**



Quality Control Department Organization Chart



QC Personnel Minimum Qualifications

100-03

Program Administrator

Min. 5 yrs experience in airport/highway construction and at least 1 of:

- P.E. w/1 yr airport paving experience
- E.I.T. w/2 yrs airport paving experience
- An individual w/ 3 yrs experience w/ BS in Civil Eng, C.E.T., or Construction
- Construction Materials Tech w/NICET Level III
- NICET certified engineer tech in CE Technology w/5yrs paving experience

The Program Administrator shall have full authority to institute any and all actions necessary for the successful implementation of the Quality Control Program to ensure compliance with the contract plans and technical specifications. The Program Administrator shall report directly to a responsible officer of the construction firm. The Program Administrator may supervise the Quality Control Program on more than one project provided that person can be at the job site within two (2) hours after being notified of a problem.



Federal Aviation
Administration

QC Personnel Minimum Qualifications

100-03

Quality Control Technicians

Shall be either engineers, engineering technicians, or experienced craftsman with NICET Level II or higher and shall have a minimum of 2 years experience in their area of expertise.

The quality control technicians shall report directly to the Program Administrator and shall perform the following functions:

- (1) Inspection of all materials, construction, plant, and equipment for conformance to the technical specifications, and as required by subsection 100-06.
- (2) Performance of all quality control tests as required by the technical specifications and subsection 100-07.
- (3) Performance of density tests for the Engineer when required by the technical specifications.

*Certification at an equivalent level, by a state or nationally recognized organization will be acceptable in lieu of NICET certification.



Federal Aviation
Administration

Project Progress Schedule

100-04

- **Shall submit a coordinated construction schedule prepared as a network diagram in CPM, PERT, or other format.**
- **Information on sequence of work activities, milestone dates, and activity duration.**
- **Contractor shall maintain the work schedule and provide an update & analysis of the progress twice monthly or otherwise specified by the contract.**



Federal Aviation
Administration

Submittals Schedule

100-05

- **Specification Item Number**
- **Item Description**
- **Description of Submittal**
- **Specification paragraph requiring submittal**
- **Scheduled Date of Submittal**



Specification Number	Item Description	Description of Submittal	Specification Requiring Submittal	Submittal Responsibility	Submittal Date	Approval Date
P-401	Plant Mix Bituminous Pavements	Coarse Aggregate Quality Testing	401-2.1a, 2.4a			
		Fine Aggregate Quality Testing	401-2.1b, 2.4b			
		Mix Design JMF	401-3.1, 3.2			
		Mineral Filler Certification	401-2.2, 2.4c			
		Bituminous Material Certification	401-2.3, 2.4d			
		Test Section Test Results & Approval Letter	401-3.4			
		Lab Accreditation Certificate	401-3.5			
		Plant Weight Scale Certification	401-4.2a			
		Paving Plan	-			
		Production Material Acceptance Testing (See QA Testing Schedule)	401-5.1, 5.2			
		P-401 QC Elements	401-6.1			
		Production Material Process Control Testing (See QC Testing Schedule)	401-6.1, 6.2, 6.3, 6.5			
		Weight Tickets for Payment	401-7.1, 8.1			

Inspection Requirements

100-06

a. During plant operation for material production, quality control test results and periodic inspections shall be utilized to ensure the quality of aggregates and other mix components, and to adjust and control mix proportioning to meet the approved mix design and other requirements of the technical specifications. All equipment utilized in proportioning and mixing shall be inspected to ensure its proper operating condition. The Quality Control Program shall detail how these and other quality control functions will be accomplished and used.



Federal Aviation
Administration

Inspection Requirements

100-06

b. During field operations, quality control test results and periodic inspections shall be utilized to ensure the quality of all materials and workmanship. All equipment utilized in placing, finishing, and compacting shall be inspected to ensure its proper operating condition and to ensure that all such operations are in conformance to the technical specifications and are within plan dimensions, lines, grades, and tolerances specified. The Program shall document how these and other quality control functions will be accomplished and utilized.



Federal Aviation
Administration

Quality Control Testing Plan

100-07

- **Minimum number of tests and frequencies**
- **Specification item number (e.g., P-401, P-501)**
- **Item Description**
- **Test type (e.g., gradation, asphalt content)**
- **Test standard (e.g., ASTM)**
- **Responsibility (e.g., plant technician); and**
- **Control requirements (e.g., target, permissible deviations)**



Documentation

100-08

- **Maintain records of all inspections and tests performed**
- **Factual evidence**
- **Type & number of inspections and/or tests**
- **Results of inspections; nature of defects, deviations, causes for rejection**
- **Proposed remedial action; and corrective actions taken**
- **Include a statement that all supplies and materials are in full compliance**
- **Signed by Program Administrator**
- **Furnished to the Engineer**



Federal Aviation
Administration

Documentation

Daily Inspection Reports

100-08

a. Each Contractor quality control technician shall maintain a daily log of all inspections performed for both Contractor and subcontractor operations. These technician's daily reports shall provide factual evidence that continuous quality control inspections have been performed and shall, as a minimum, include the following

- (1) Technical spec item # & description
- (2) Compliance with approved submittals
- (3) Proper storage of materials & equipment
- (4) Proper operation of all equipment
- (5) Adherence to plans & technical spec's
- (6) Review of QC tests
- (7) Safety inspection



Documentation

Daily Test Reports

100-08

b. The Contractor shall be responsible for establishing a system that will record all quality control test results. Daily test reports shall document the following information:

- (1) Technical specification item number and description
- (2) Test designation
- (3) Location
- (4) Date of test
- (5) Control requirements
- (6) Test results
- (7) Causes for rejection
- (8) Recommended remedial actions
- (9) Retests



Federal Aviation
Administration

Corrective Action Requirements

100-09

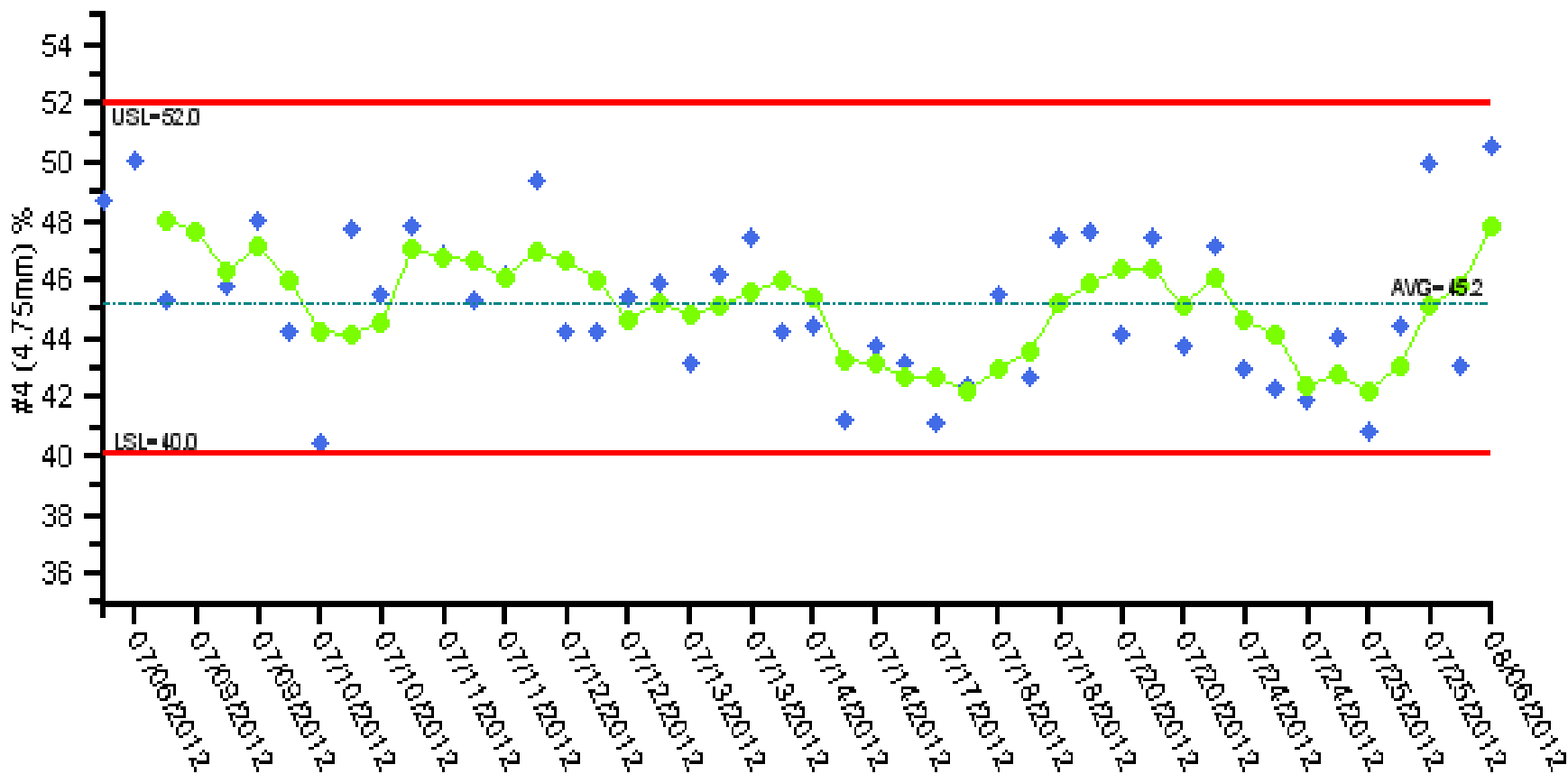
- **Outline of actions to be taken when a process is deemed, or believed to be out of control (out of tolerance) and what is needed to bring it back into control**
- **How the results of QC test and inspections are used for determining the need for corrective action.**
- **Clear sets of rules or standards to gauge the process is out of control and the corrective action to regain process control**
- **Use of statistical quality control charts**



#4 (4.75mm) %



◆ Test Data ● Running Average - - - Average — Specification

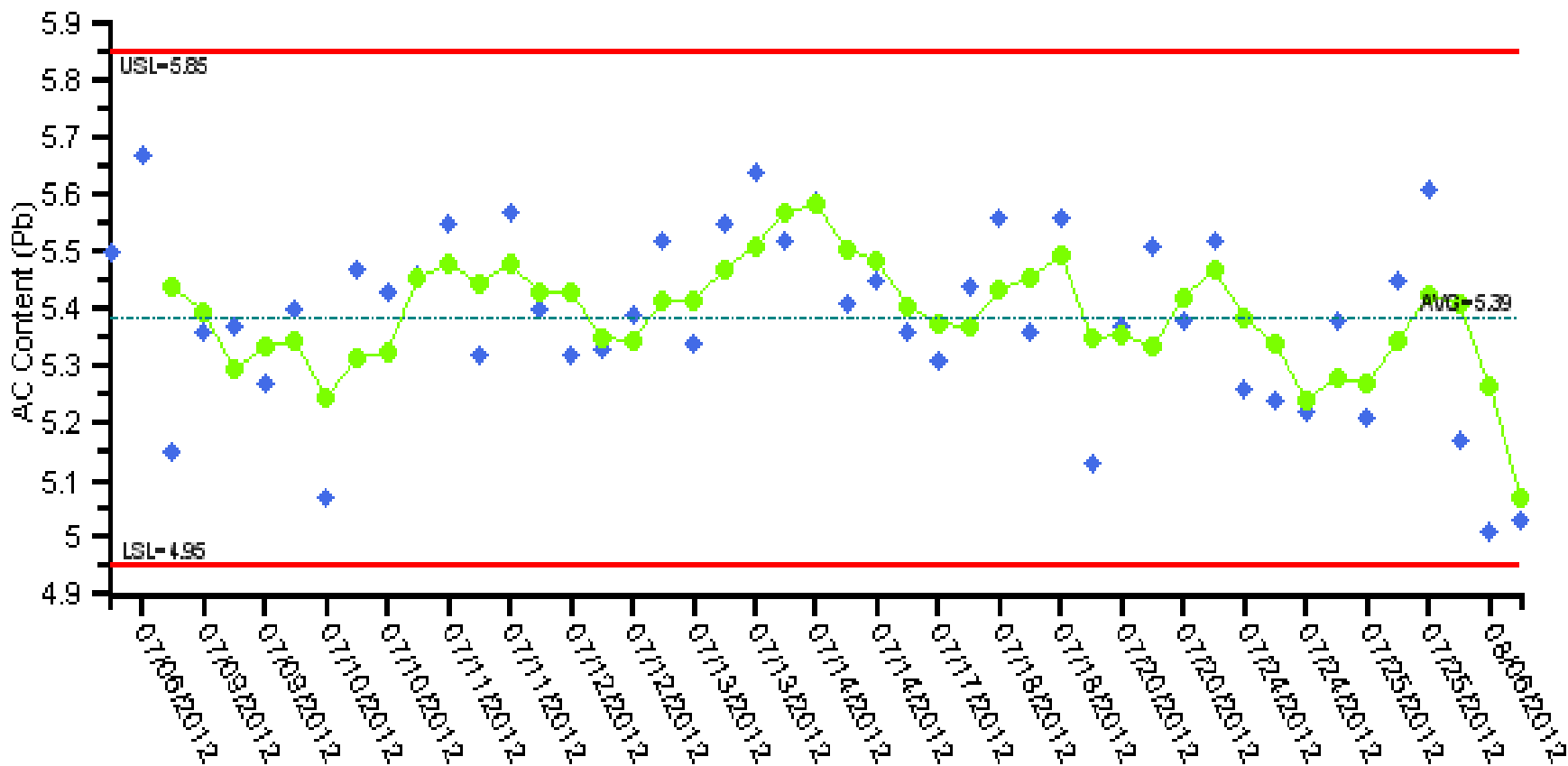


Tests: 46 Average: 45.2 SD: 2.58 Specification: '12 FAA 3/4" 75 Blow 64-34 40.0-52.0 PWS: 97.4

AC Content (Pb)



◆ Test Data ● Running Average - - - Average — Specification



Tests: 47 Average: 5.39 SD: 0.159 Specification: '12 FAA 3/4" 75 Blow 64-34 4.95-5.85 PWS: 99.53

AC 150/5370-10G, Section 110

Method of Estimating Percentage of Material within Specification Limits (PWL)

FAA Acceptable Quality

- Items P-401 and P-501 assumes process control parameters that are “not unreasonable” for mat density, air voids, and joint density (P-401) and strength, and thickness (P-501)
- All acceptance criteria is based on processes with variation in quality conforming to a normal “bell” curve.
- Each day’s production is evaluated and pay is based on daily evaluation of 4 random samples and possible retest sampling.



Section 110 (PWL)

It is the intent of this section to inform the Contractor that, in order to consistently offset the Contractor's risk for material evaluated, production quality (using population average and population standard deviation) must be maintained at the acceptable quality specified or higher. In all cases, it is the responsibility of the Contractor to produce at quality levels that will meet the specified acceptance criteria when sampled and tested at the frequencies specified.

Spreadsheets for PWL calculations are available at the following website:
http://www.faa.gov/airports/engineering/design_software/

- 110-02 Method for computing PWL
- EXAMPLE OF PWL CALCULATION
- EXAMPLE OF OUTLIER CALCULATION (REFERENCE ASTM E178)



FAA AC 150/5370-10

Testing Laboratory

P-401 & P-403-3.4: Job Mix Formula (JMF) Laboratory

Contractor's laboratory used to develop the JMF shall meet the requirements of ASTM D 3666.

Laboratory accreditation must be current and listed on the accrediting authority's website. All test methods required for developing the JMF must be listed on the lab accreditation.

A copy of the laboratory's current accreditation and accredited test methods shall be submitted to the Engineer prior to start of construction

P-401 & P-403-5.1: Acceptance Sampling and Testing

Laboratory requirements - Same as above



FAA AC 150/5370-10

Testing Laboratory

5370-10A **Feb 1989 / Jan 1991**

401-3.5 TESTING LABORATORY. The laboratory used to develop the job mix formula shall meet the requirements of ASTM D 3666. A certification signed by the manager of the laboratory stating that it meets these requirements shall be submitted to the Engineer prior to the start of construction. The certification shall contain as a minimum:

- a. Qualifications of personnel; laboratory manager, supervising technician, and testing technicians.
- b. A listing of equipment to be used in developing the job mix.
- c. A copy of the laboratory's quality control system.
- d. Evidence of participation in the AASHTO Materials Reference Laboratory (AMRL) program



**Federal Aviation
Administration**

FAA AC 150/5370-10

Testing Laboratory

5370-10B

April 2005

401-3.5 TESTING LABORATORY. The Contractor's laboratory used to develop the job mix formula shall meet the requirements of ASTM D 3666 including the requirement to be accredited by a national authority such as the National Voluntary Laboratory Accreditation Program (NVLAP), the American Association for Laboratory Accreditation (AALA), or AASHTO Accreditation Program (AAP). Laboratory personnel shall meet the requirements of Section 100 of the General Provisions. A certification signed by the manager of the laboratory stating that it meets these requirements shall be submitted to the Engineer prior to the start of construction. The certification shall contain as a minimum:

- a. Qualifications of personnel; laboratory manager, supervising technician, and testing technicians.
- b. A listing of equipment to be used in developing the job mix.
- c. A copy of the laboratory's quality control system.
- d. Evidence of participation in the AASHTO Materials Reference Laboratory (AMRL) program
- e. ASTM D 3666 certification of accreditation by a nationally recognized accreditation program



Federal Aviation
Administration

FAA AC 150/5370-10

Testing Laboratory

5370-10C, 10D, 10E Sep 2007, 2008, 2009

401-3.5 TESTING LABORATORY. The Contractor's laboratory used to develop the job mix formula shall meet the requirements of ASTM D 3666 including the requirement to be accredited by a national authority such as the National Voluntary Laboratory Accreditation Program (NVLAP), the American Association for Laboratory Accreditation (AALA), or AASHTO Accreditation Program (AAP). Laboratory personnel shall meet the requirements of Section 100 of the General Provisions. A certification signed by the manager of the laboratory stating that it meets these requirements shall be submitted to the Engineer prior to the start of construction. The certification shall contain as a minimum:

- a. Qualifications of personnel; laboratory manager, supervising technician, and testing technicians.
- b. A listing of equipment to be used in developing the job mix.
- c. A copy of the laboratory's quality control system.
- d. Evidence of participation in the AASHTO Materials Reference Laboratory (AMRL) program
- e. ASTM D 3666 certification of accreditation by a nationally recognized accreditation program



**Federal Aviation
Administration**

FAA AC 150/5370-10

Testing Laboratory

5370-10F

Sep 2011

1-3.5 TESTING LABORATORY. The Contractor's laboratory used to develop the job mix formula shall meet the requirements of ASTM D 3666 ~~including the requirement to be accredited by a national authority such as the National Voluntary Laboratory Accreditation Program (NVLAP), the American Association for Laboratory Accreditation (AALA), or AASHTO Accreditation Program (AAP). Laboratory personnel shall meet the requirements of Section 100 of the General Provisions. A certification signed by the manager of the laboratory stating that it meets these requirements shall be submitted to the Engineer prior to the start of construction. The certification shall contain as a minimum:~~

- ~~a. Qualifications of personnel; laboratory manager, supervising technician, and testing technicians.~~
- ~~b. A listing of equipment to be used in developing the job mix.~~
- ~~c. A copy of the laboratory's quality control system.~~
- ~~d. Evidence of participation in the AASHTO Materials Reference Laboratory (AMRL) program~~
- ~~e. ASTM D 3666 certification of accreditation by a nationally recognized accreditation program~~



Federal Aviation
Administration

FAA AC 150/5370-10

Testing Laboratory

5370-10F **Sep 2011**

401-3.5 JOB MIX FORMULA (JMF) LABORATORY. The Contractor's laboratory used to develop the job mix formula shall meet the requirements of ASTM D 3666. The laboratory accreditation must be current and listed on the accrediting authority's website. All test methods required for developing the JMF must be listed on the lab accreditation. A copy of the laboratory's current accreditation and accredited test methods shall be submitted to the Engineer prior to start of construction.

5370-10G **Jul 2014**

401-3.4 Job mix formula (JMF) laboratory. The Contractor's laboratory used to develop the JMF shall be accredited in accordance with ASTM D3666. The laboratory accreditation must be current and listed on the accrediting authority's website. All test methods required for developing the JMF must be listed on the lab accreditation. A copy of the laboratory's current accreditation and accredited test methods shall be submitted to the Engineer prior to start of construction.



Federal Aviation
Administration

FAA AC 150/5370-10

Testing Laboratory

5370-10G

Jul 2014

401-3.4 Job mix formula (JMF) laboratory. The Contractor's laboratory used to develop the JMF shall be accredited in accordance with ASTM D3666. The laboratory accreditation must be current and listed on the accrediting authority's website. All test methods required for developing the JMF must be listed on the lab accreditation. A copy of the laboratory's current accreditation and accredited test methods shall be submitted to the Engineer prior to start of construction.

501-3.5 Concrete mix design laboratory. The Contractor's laboratory used to develop the concrete mix design shall be accredited in accordance with ASTM C1077. The laboratory accreditation must be current and listed on the accrediting authority's website. All test methods required for developing the concrete mix design must be listed on the lab accreditation. A copy of the laboratory's current accreditation and accredited test methods shall be submitted to the Engineer prior to start of construction



**Federal Aviation
Administration**

FAA AC 150/5370-10

Testing Laboratory

5370-10G

Jul 2014

401-5.1 Acceptance sampling and testing. Unless otherwise specified, all acceptance sampling and testing necessary to determine conformance with the requirements specified in this section will be performed by the Engineer at no cost to the Contractor except that coring [and profilograph testing] as required in this section shall be completed and paid for by the Contractor. Testing organizations performing these tests [except profilograph] shall be accredited in accordance with ASTM D3666. The laboratory accreditation must be current and listed on the accrediting authority's website. All test methods required for acceptance sampling and testing must be listed on the lab accreditation. A copy of the laboratory's current accreditation and accredited test methods shall be submitted to the Engineer prior to start of construction. All equipment in Contractor furnished laboratories shall be calibrated by an independent testing organization prior to the start of operations at the Contractor's expense.

501-5.1 Testing organizations performing these tests shall be accredited in accordance with ASTM C1077. The laboratory accreditation must be current and listed on the accrediting authority's website. All test methods required for acceptance sampling and testing must be listed on the lab accreditation. A copy of the laboratory's current accreditation and accredited test methods shall be submitted to the Engineer prior to start of construction.



Federal Aviation
Administration

FAA QC Pavement Questions

Greg Cline, P.E.

Gregory.cline@faa.gov

(202) 267-8814

Doug Johnson, P.E.

Doug.johnson@faa.gov

(202) 267-4689

