Designation: D3666 – 16

Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials[1]

This standard is issued under the fixed designation D3666; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 This specification covers the minimum requirements for field and laboratory personnel, for establishing and maintaining a quality system, and establishes minimum qualifications for agencies engaged in the testing and inspection of road and paving materials.

1.2 Criteria are provided for evaluating the capability of an agency to properly perform designated tests on road and paving materials, and for establishing guidelines pertaining to an agency's organization, personnel, facilities, and quality system. This specification may be supplemented by more specific criteria, such as that in Specification E329, and requirements for particular projects.

1.3 This specification can be used as a basis to evaluate testing or inspection agencies, or both, and is intended for use for the qualifying or accrediting, or both, of testing or inspection agencies, public or private, engaged in the testing and inspection of road and paving materials.

1.4 Accreditation is required to comply with this standard. (See 8.1.5.)

1.5 The users of the accredited agency must review the agency's scope of accreditation to ensure the agency has been accredited for its technical competence to perform the tasks requested by the user.

1.6 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 The following referenced documents are those that are specifically mentioned in this specification. These referenced documents are not meant to be all inclusive, as this specification applies, as appropriate, to all test methods under the jurisdiction of Committee D04.

2.2 *ASTM Standards:*[2]

D5 Test Method for Penetration of Bituminous Materials

D8 Terminology Relating to Materials for Roads and Pavements

D36 Test Method for Softening Point of Bitumen (Ring-and-Ball Apparatus)

D70 Test Method for Density of Semi-Solid Bituminous Materials (Pycnometer Method)

D92 Test Method for Flash and Fire Points by Cleveland Open Cup Tester

D113 Test Method for Ductility of Bituminous Materials (Withdrawn 2016)[3]

D139 Test Method for Float Test for Bituminous Materials

D244 Test Methods and Practices for Emulsified Asphalts

D1074 Test Method for Compressive Strength of Bituminous Mixtures

D1075 Test Method for Effect of Water on Compressive Strength of Compacted Bituminous Mixtures

D1560 Test Methods for Resistance to Deformation and Cohesion of Asphalt Mixtures by Means of Hveem Apparatus

D1561 Practice for Preparation of Bituminous Mixture Test Specimens by Means of California Kneading Compactor

D1754 Test Method for Effects of Heat and Air on Asphaltic Materials (Thin-Film Oven Test)

D1856 Test Method for Recovery of Asphalt From Solution by Abson Method

D2170 Test Method for Kinematic Viscosity of Asphalts (Bitumens)

D2171 Test Method for Viscosity of Asphalts by Vacuum Capillary Viscometer

[1] This specification is under the jurisdiction of ASTM Committee D04 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.95 on Quality Control, Inspection and Testing Agencies.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] The last approved version of this historical standard is referenced on www.astm.org.

D2872 Test Method for Effect of Heat and Air on a Moving Film of Asphalt (Rolling Thin-Film Oven Test)
D3143 Test Method for Flash Point of Cutback Asphalt with Tag Open-Cup Apparatus
D5506 Practice for Organizations Engaged in the Certification of Personnel Testing and Inspecting Bituminous Paving Materials (Withdrawn 2015)[3]
D6084 Test Method for Elastic Recovery of Asphalt Materials by Ductilometer
D6926 Practice for Preparation of Bituminous Specimens Using Marshall Apparatus
D6927 Test Method for Marshall Stability and Flow of Asphalt Mixtures
E329 Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection
E1301 Guide for Proficiency Testing by Interlaboratory Comparisons (Withdrawn 2012)[3]

3. Terminology

3.1 *Definitions*—The approved standard definitions are listed below.

3.1.1 *quality system, n*—the organizational structure, responsibilities, procedures, activities, capabilities, and resources that together aim to ensure that laboratory services satisfy data requirements.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *agency, n*—the organization engaged to test or inspect road and paving materials as required by a specification or contract.

3.2.2 *quality system manual (QSM)*—a set of documents describing an agency's quality system.

3.2.3 *user*—the person or organization engaging the agency to provide inspections or tests; or using this specification to evaluate or accredit the agency.

3.2.4 *calibration, n*—a process that establishes the relationship (traceability) between the results of a measurement instrument, measurement system, or material measure and the corresponding values assigned to a reference standard.

3.2.4.1 *Discussion*—The purpose of calibration is to establish the traceability of a measurement on certain types of equipment, such as balances (measurement instrument) and dynamic shear rheometer (measurement system). Uncertainty estimates obtained during calibration are used to judge if an instrument is suitable for its intended purpose. There is a need to re-establish traceability or recalibrate only when instrument measurements drift out of control (as determined through verification of calibration).

3.2.5 *check, n*—a specific type of inspection and/or measurement performed on equipment and materials to indicate compliance or otherwise with stated criteria.

3.2.5.1 *Discussion*—Checks are performed on items of equipment that do not make measurements, such as specimen molds and ovens. Stated criteria can be dimensional tolerances.

3.2.6 *quality system manual (QSM), n*—a set of documents describing an agency's quality system.

3.2.7 *standardization, n*—a process that determines whether adjustments are needed to a specific piece of equipment, such as pycnometers and flow meters, when its performance is compared with that of a generally accepted standard.

3.2.8 *traceability, n*—the property of a result of a measurement whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties.

3.2.8.1 *Discussion*—There is a need for traceable measurements. Measurements, not the instrument, can be traceable. Measurement traceability is established through calibration. Measurement traceability is maintained through check of calibration (a regular check of instrument output using a control standard).

3.2.9 *uncertainty, n*—a parameter associated with the result of a measurement that defines the range of the values that could be attributed to the measured quantity.

3.2.9.1 *Discussion*—The uncertainty of a measurement is required in order to establish its traceability. The uncertainty estimates obtained during calibration are used to judge if an instrument is suitable for its intended purpose.

3.2.10 *user, n*—the person or organization engaging the agency to provide inspections or tests; or using this specification to evaluate or accredit the agency.

3.2.11 *verification, n*—a process that establishes whether the results of a previously calibrated measurement instrument, measurement system, or material measure are stable.

3.2.11.1 *Discussion*—Verification is used to maintain the traceability of a measurement and to determine when to recalibrate. Control charts are often used to plot verification results and determine if instrument measurements have drifted out of control.

3.3 *Other Definitions:*

3.3.1 Refer to Terminology D8.

4. Significance and Use

4.1 This specification provides the basic minimum criteria for use in evaluating the qualifications of testing or inspection agencies, or both, for road and paving materials. The criteria may be supplemented by more specific criteria and requirements. An individual user can also use it to judge the qualification of an agency.

4.2 The intent of this specification is to provide a consensus basis for evaluating a testing or inspection agency, or both, with respect to that agency's capability to objectively and competently provide the specific services needed by the user.

4.3 This specification can be used as a basis for accreditation.

5. Responsibilities and Duties

5.1 The agency shall ensure that only inspections or tests for which it is adequately equipped and staffed are performed.

5.2 The agency shall ensure that personnel perform only inspections and tests for which they are adequately trained, qualified, and certified in accordance with applicable specifications.

5.3 The agency shall ensure that all equipment is properly maintained in good operating condition and is calibrated as applicable.

5.4 The agency shall perform all testing and inspection in accordance with appropriate standards and quality control criteria. Documents unique to the user shall be furnished to the agency.

6. General Capabilities

6.1 *Laboratory Testing*—The laboratory testing services of a road and paving materials testing agency shall include some or all of the following capabilities:

6.1.1 Testing of road and paving materials and mixtures in the laboratory,

6.1.2 Testing of aggregate for compliance with specification requirements,

6.1.3 Preparation and evaluation of mix design in accordance with the proper method common to the geographical area in which it offers services or in accordance with the appropriate ASTM or AASHTO standard procedure,

6.1.4 Determination of percent binder and gradation of plant aggregates in plant mix, and

6.1.5 Determination and verification of mix properties for comparison with the mix design.

6.2 *Field Testing and Inspection*—The field services of a road and paving materials testing and inspection agency shall include some or all of the following capabilities:

6.2.1 Investigation of aggregate at the source for compliance with specification requirements,

6.2.2 Inspection of proportioning and mixing at the plant or project site in accordance with user's requirements.

6.2.3 Inspection of handling, laying, and rolling operations of the mixture at the site,

6.2.4 Determination of thickness of compacted mixture, and

6.2.5 Determination of density and the percent compaction of a bituminous pavement after construction.

NOTE 1—Since the requirements for construction control can vary widely from project to project depending upon the nature of the mixture, location, and intended use of the bituminous mixture in the project, the capability of the agency for testing and inspection should be that necessary to accomplish construction control of the user's specific project or special requirements.

7. Personnel Qualifications

7.1 *Management and Supervision*—The testing and inspection services of the agency shall be under the direction of a person charged with scientific or engineering managerial responsibility. This person should be a licensed engineer and a full-time employee of the agency and shall have a minimum of 5 years experience in inspecting and testing of road and paving materials and construction; however, in place of being a licensed engineer, a person with equivalent science-oriented education and experience in having satisfactorily directed testing or inspection services, or both, of road and paving materials is acceptable. This person shall possess all applicable professional licenses or certificates required by public law or requirements of the authority in one or more fields which the person directs.

7.2 *Field/Plant Inspector or Testing Technician Supervisor:*

7.2.1 This person shall have a minimum of 3 years of relevant and progressively more responsible experience in testing or inspection, or both, of road and paving materials and hot mix asphalt construction as appropriate to their job classification.

7.2.2 This person shall have applicable technician level or inspector level, or higher, certifications/qualifications (see Note 2) through a program approved by a state DOT or a national or regional authority.

7.3 *Field/Plant Inspector or Testing Technician:*

7.3.1 This person shall have applicable technician level or inspector level certifications/qualifications (see Note 2) through a program approved by a state DOT or a national or regional authority.

7.3.2 Trainees working toward certification can be used to perform the inspection or test, or both, if they work under the supervision of a certified/qualified individual as described in Sections 7.2.2 or 7.3.1, at the same facility, project, or plant. The trainee cannot evaluate the test or inspection results or sign acceptance reports. The trainee must achieve certification within 2 years from the start of work as a trainee.

7.4 It is satisfactory for a person to fill one or more of the levels of management, supervision, inspector, or technician positions in accordance with 7.1, 7.2, and 7.3 provided that person qualifies for the highest level. It is also recognized that frequently a few laboratory control tests are conducted at small field or peripheral locations; it is not the intent of this practice that the supervisory personnel be directly present at such locations at all times.

NOTE 2—The organization certifying should meet the requirements of Practice D5506.

8. Quality System Criteria

8.1 The agency shall establish and implement a quality system which meets the following criteria:

8.1.1 *Quality System Manual (QSM)*—The agency shall establish and maintain a QSM that conforms to the requirements in Section 9. Each document in the QSM shall indicate its preparation date. If a document is revised, the date of revision shall be indicated on the document. The QSM shall be available for use by laboratory staff.

8.1.2 *Quality System Management*—The agency shall designate a person(s) having responsibility for determining if quality system implementation activities are being conducted by agency staff in the manner specified in the agency's quality system manual. This individual(s) shall have direct access to top management (see Note 3).

NOTE 3—This individual(s) may have other responsibilities (for example, laboratory manager).

NOTE 4—Inspection and testing procedures may reference published standards.

8.1.3 *Equipment Calibration and Checks*—The agency shall calibrate, standardize, or check all significant testing equipment associated with tests covered by the scope of this standard which the agency performs. As a minimum, the equipment

listed in Table 1 and Table 2, shall be included if it is associated with tests performed by the agency.

8.1.3.1 *Calibration and Standardization*—Applicable measurement equipment shall be calibrated or standardized at the intervals specified in the agency's QSM. The calibration and standardization intervals specified in the QSM shall be no greater than those indicated in Table 1 and Table 2. However, when a maximum calibration or standardization interval for a specific piece of measurement equipment is specified in a standard, the interval specified by the laboratory in the QSM shall not exceed this interval unless the equipment is calibrated or standardized before each use. Measurement equipment that has been removed from service and newly acquired equipment without a calibration or standardization certificate shall be calibrated before being placed in service.

8.1.3.2 *Checks*—Applicable equipment shall be checked at the intervals specified in the agency's QSM. The check intervals specified in the QSM shall be no greater than those indicated in Table 1 and Table 2. However, when a maximum check interval for a specific piece of equipment is specified in a standard, the interval specified by the laboratory shall not exceed this interval unless the equipment is checked before each use. Any item of equipment which has been shown by checking or otherwise to be defective shall be taken out of service and clearly identified. Equipment that has been removed from service and newly acquired equipment and materials without manufacturer's certification shall be checked before being placed into service.

8.1.4 *Inspection of Facilities*—The agency shall have its laboratory procedures and equipment inspected at intervals of approximately 2 years by an evaluation authority as evidence of its competence to perform required tests. The agency shall within 30 days of the receipt of the evaluation authority written report document on how the deficiencies were corrected.

TABLE 1 Bituminous Materials Test Equipment

Equipment—Test Method	Requirement	Interval (Month)
Saybolt Viscometers—D244	Standardize	36
Timing Devices—D5, D2170, D2171	Calibrate	12
Penetrometer Needle—D5	Check Condition and Critical Dimensions	12
Penetrometer—D5	Standardize	12
Ductility Machine—D113, D6084	Check Speed of Travel	12
TFO and RTFO Oven Shelf—D1754, D2872	Check Rotation Speed	12
Brass Rings and Assembly—D36	Check Critical Dimensions	12
Pycnometers—D70	Check Physical Condition	12
Pycnometers—D70	Standardize	12
Collars and Floats—D139	Check Critical Dimensions	12
Flowmeters—D1856, D2872	Standardize	12
Flash Cups—D92, D3143	Check Critical Dimensions	12
Compression Testing Machine—D1074, D1075, D6927, D1560	Standardize	12
CA Kneading Compactor—D1561	Standardize	24
Followers, Calibration Cylinders—D1560, D1561	Check Critical Dimensions	12
Compaction Hammers, Breaking Heads—D6926	Check Critical Dimensions, Check Mass of Hammer	12
Plungers—D1074	Check Critical Dimensions	12
Asphalt Ignition Furnace, Internal balances	Standardize	12

TABLE 2 General Laboratory Test Equipment

Equipment—Test Method	Requirement	Interval (Month)
Mechanical Shakers	Check Sieving Thoroughness	12
General Purpose Drying Ovens	Standardize Thermometric Device	12
Coarse Sieves (Openings = 4.75 mm)	Check Physical Condition and Dimensions of Openings	12
Fine Sieves (Openings < 4.75 mm)	Check Physical Condition	12
Specimen Molds	Check Critical Dimensions	12
General Purpose Balances and Masses	Standardize	12
Temperature Measuring Devices	Standardize	12
Analytical Balances and Masses	Calibrate	12
Calipers	Calibrate	12
Vaccuum/Pressure Gages	Standardize	12

8.1.5 *Accreditation*—The agency shall maintain a current, verifiable accreditation listing that includes this standard and at least three standards covering each scope of testing relevant to this standard.

NOTE 5—The scope of testing is intended to distinguish the laboratory's testing competencies. If a laboratory maintains accreditation for at least three asphalt mixture standards, that laboratory may qualify for Specification D3666 accreditation for asphalt mixture testing. If the laboratory was also performing at least three aggregate test methods, that laboratory may also qualify for Specification D3666 accreditation for aggregate testing.

8.1.6 *Proficiency Sample Testing*—Participation in proficiency sample programs (PSP). The laboratory shall participate in aggregate, asphalt binder, or hot mix asphalt proficiency sample programs or all if the laboratory performs testing in all areas. The PSP used must meet the following criteria: *(1)* include a minimum of 10 participants, *(2)* issue a report that includes the laboratory's results, the average of all results, the standard deviation of the results, and rating(s) based on the number of standard deviations that the laboratory's results vary from the grand average for the test method(s) covered, *(3)* be independent of the participating laboratories, *(4)* distribute samples at least once annually, and *(5)* maintain a record of all sample test results from participants for at least 3 years.

NOTE 6—For additional guidance in selecting a proficiency sample program the laboratory may wish to consult Guide E1301.

8.1.6.1 The laboratory shall establish procedures for responding to low proficiency sample program ratings. Ratings are considered to be low if the laboratory's result is beyond two standard deviations from the grand average on the final report.

8.1.7 *Test Records*—The agency shall maintain test records which contain sufficient information to permit verification of any test reports. Records pertaining to testing shall include original observations, calculations, derived data, and an identification of personnel involved in sampling and testing. The agency shall prepare test reports which clearly, accurately, and unambiguously present the information specified in Table 3. The procedure for amending reports shall require that the previously existing report be clearly referenced when an amendment is made. The references shall establish a clear audit trail from the latest issuance or deletion to the original report and its supporting data.

TABLE 3 Test Report Requirements (see Note 7)

(*1*) Name and address of the testing laboratory
(*2*) Identification of the report and the date issued
(*3*) Name and address of the client or identification of the project
(*4*) Description and identification of the test sample
(*5*) Date of receipt of the test sample
(*6*) Date(s) of test performance
(*7*) Identification of the standard test method used and a notation of any known deviations from the test method
(*8*) Test results and other pertinent data required by the standard test method
(*9*) A name of the person(s) accepting technical responsibility for the test report

NOTE 7—The requirements in Table 3 apply to the record that is used to present the laboratory's test results in their final form. In some cases, a test report or test data sheet is the final form of the data.

8.1.8 *Records Retention*—Records pertaining to testing, equipment calibration, standardization and check, test reports, internal quality system reviews, proficiency sample testing, test technician training and evaluation, and personnel shall be retained by the laboratory in a secure location for a minimum of one year.

NOTE 8—Although a 1 year retention schedule is adequate in some instances, there are many circumstances when a longer retention may be advantageous to the agency. Records concerning the calibration and verification of equipment are an example. Retention schedules of this type usually require such records to be held throughout the useful life of the equipment.

8.1.9 *Equipment Calibration, Standardization, and Check Records*—The agency shall maintain calibration, standardization, and check records for all equipment specified in the QSM. Such records shall include:

8.1.9.1 Detailed results of the calibration, standardization, and check work performed (dimensions, mass, force, frequency, temperature, time, and so forth),

8.1.9.2 Description of the equipment calibrated or verified including model and serial number or other acceptable identification (see 9.1.3.1),

8.1.9.3 Date the work was done,

8.1.9.4 Identification of the individual performing the work,

8.1.9.5 Identification of the calibration, standardization, or check procedure used,

8.1.9.6 The previous calibration, standardization, or check date and the next due date, and

8.1.9.7 Identification of any in-house calibration, standardization, or check device used.

8.1.10 *External Audit Records*—The agency shall maintain records of any external audits and documentation describing how the deficiencies were corrected.

8.1.11 *Proficiency Sample Records*—The agency shall retain results of participation in proficiency sample programs including data sheets, summary reports, and documentation describing steps taken to determine the cause of poor results and corrective actions taken.

8.1.12 *Test Methods and Procedures*—The agency shall maintain copies of standard and nonstandard procedures for testing performed which is covered by the scope of this standard and shall ensure that the procedures are the most current and are readily accessible to employees performing the work. (See Note 4.)

9. Quality System Manual (QSM) Requirements

9.1 The agency shall establish and maintain a QSM meeting the following requirements:

9.1.1 *Organization and Organizational Policies:*

9.1.1.1 The QSM shall contain the legal name and address of the agency—and that of the main office or company, if different—and any other information needed to identify the organization.

9.1.1.2 The QSM shall contain the ownership and management structure of the agency. Names, affiliations and positions of principal officers and directors shall be listed.

9.1.1.3 The QSM shall contain an organization chart showing relevant internal organizational components.

9.1.2 *Staff:*

9.1.2.1 The QSM shall contain an outline or chart showing operational personnel positions and their lines of authority and responsibility.

9.1.2.2 The QSM shall contain position descriptions for each technical operational position shown on the agency's organization chart in testing areas covered by the scope of this standard. These descriptions shall identify the position and include a description of the duties associated with the position, required skills, education, and experience. A reference to where the required position descriptions may be found is acceptable if they are not included in the QSM.

9.1.2.3 The QSM shall contain a brief biographical sketch, noting the education, work experience, licensure, and certifications of technical staff involved in testing areas covered by the scope of this standard. Alternatively, the QSM may contain a reference to the location of the biographical sketches.

9.1.2.4 The QSM shall contain a document which describes the method(s) used to ensure that all agency technical staff are trained and qualified to perform tests covered by the scope of this standard. In addition to the description of training methods the document shall indicate what position(s) or employee(s) is responsible for the agency training program and maintenance of training records.

NOTE 9—There may be several different methods employed for differing conditions of staff experience and background including (*1*) on-the-job apprentice training (one on one) for new employees with little or no experience in laboratory or inspection work; (*2*) verification of competency by the agency for an individual with prior experience performing a specific test; (*3*) formal in-house training sessions for certification, rating, or competency evaluation; and (*4*) training by external organizations.

9.1.2.5 The QSM shall contain a document describing the method(s) used to evaluate staff competency to ensure that each test covered by the scope of this standard is performed in accordance with standard procedures. This description shall include the frequency of evaluations for each technician and indicate what position(s) or employee(s) is responsible for evaluating staff competency and maintaining records. These procedures shall ensure that each technician performing the test method is evaluated.

NOTE 10—Proficiency sample testing may be useful in evaluating staff competency, however, it should be used in conjunction with observation of actual testing performed.

9.1.2.6 The QSM shall contain a form(s) for recording training and competency evaluation activities summarized in 9.1.2.4 and 9.1.2.5 including the name of the trainee, name of the evaluator, test method evaluated, the dates and results.

9.1.3 *Facilities and Equipment:*

9.1.3.1 *Inventory*—The QSM shall contain an inventory of major sampling, testing, calibration, standardization, and checking and verification equipment associated with the test methods covered by the scope of this standard. A reference to where the inventory is located is acceptable if it is not included in the QSM. The inventory shall include, for each piece of major equipment, the name, manufacturer, model, and serial number. An identification number assigned by the agency or other unique identifying information may be substituted for the model and serial number if this is the practice normally followed by the agency.

NOTE 11—Major equipment includes equipment such as shakers, physical or chemical testing machines, balances, baths, ovens, microscopes, and computing equipment dedicated to testing. Equipment such as chairs, desks, and file cabinets may be excluded. Major equipment does not usually include expendable items such as miscellaneous glassware, sieves, molds, and viscometers.

9.1.3.2 *Equipment Calibration Standardization, and Check*—The QSM shall contain a list(s) giving a general description of equipment for performing tests covered by the scope of this standard which require calibration, standardization, or checking. For each item listed the list shall include the interval of calibration, standardization, or check a reference to the calibration or check procedure used (Note 12), and the location of calibration, standardization, and check records.

NOTE 12—The reference to the calibration, standardization, or check procedure used may indicate a standard calibration procedure, in-house calibration or verification procedure, or if the work is performed by an outside agency.

NOTE 13—In addition to being in the QSM this information may also be included in the calibration, standardization, and check records on each piece of equipment.

9.1.3.3 The QSM shall contain a document which describes the agency's method for ensuring that the calibration, standardization, and check procedures are performed for all required equipment at the specified intervals. This document shall include the position of the individual(s) responsible for ensuring that calibration, standardization, and check activities are carried out, and procedures for handling equipment which is new, removed from service, out of calibration, or defective.

9.1.3.4 The QSM shall contain in-house equipment calibration, standardization, and check procedures, when they cannot be referenced in applicable standards, or have a reference to their location.

9.1.3.5 The QSM shall contain certificates or other documents that establish the traceability of in-house equipment or reference standards used for calibration, standardizing, and checking, or have a reference to their location in their agency.

9.1.4 *Test Records and Reports:*

9.1.4.1 The QSM shall contain a document which describes methods used by the agency to produce test results and to prepare, check, and amend test reports.

9.1.4.2 The QSM shall contain typical test report forms which illustrate the manner in which tests results and supporting information (See 8.1.7) are documented.

NOTE 14—A printout showing a typical test record is acceptable if the laboratory uses electronic media for report storage.

9.1.5 *Sample Management*—The QSM shall contain a document describing procedure(s) for sample identification, storage, retention, and disposal of samples.

NOTE 15—In this context, the term "storage" refers to what is done before testing. The term "retention" refers to what is done after testing.

9.1.6 *Diagnostic and Corrective Action:*

9.1.6.1 The QSM shall contain a document(s) describing participation in proficiency sample and on-site assessment programs, methods used to identify poor results, and procedures followed when poor results or deficiencies occur.

9.1.6.2 The QSM shall contain a document outlining the method(s) used in responding to external technical complaints.

9.1.7 *Internal Quality System Review*—The QSM shall contain a document describing the scope of internal quality system reviews, establishing the frequency of these reviews, identifying individuals responsible for the review, describing the distribution of reports to management, and identifying the location of resulting records.

9.1.8 *Subcontracting*—The QSM shall contain a document describing the policies which the agency follows relative to subcontracting, if it engages in such activities. A reference to where the policies may be found is acceptable if they are not included in the QSM. These policies shall include procedures followed by the agency in selecting competent subcontractors who meet the requirements of this specification and reporting the results of testing performed by subcontractors. If the agency does not engage in such activities, the QSM shall contain a statement to that effect.

10. Keywords

10.1 calibrations; certifications; personnel qualifications; qualifications; quality control; quality system; testing paving materials; test reports