

Certified LPA Field Tested Materials



LOCAL PUBLIC AGENCY (LPA)

QUALITY ASSURANCE PROGRAM

for Certified Local Public Agency use on Federally funded
projects

(Revised November, 2013)

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LOCAL PUBLIC AGENCY (LPA) QUALITY ASSURANCE PROGRAM

I. OVERVIEW

The Oregon Department of Transportation (ODOT) has implemented a Quality Assurance (QA) program approach that complies with the FHWA Guidelines for a QA program for construction projects on the National Highway System. The LPA has adopted ODOT's QA program as modified herein. This program defines the responsibilities of the contractor and the LPA in order to satisfy the needs of the program. This program, as modified, applies to the LPA's FHWA funded projects.

The LPA recognizes that there are other benefits of developing and implementing Quality Assurance specifications into its construction program. These benefits include:

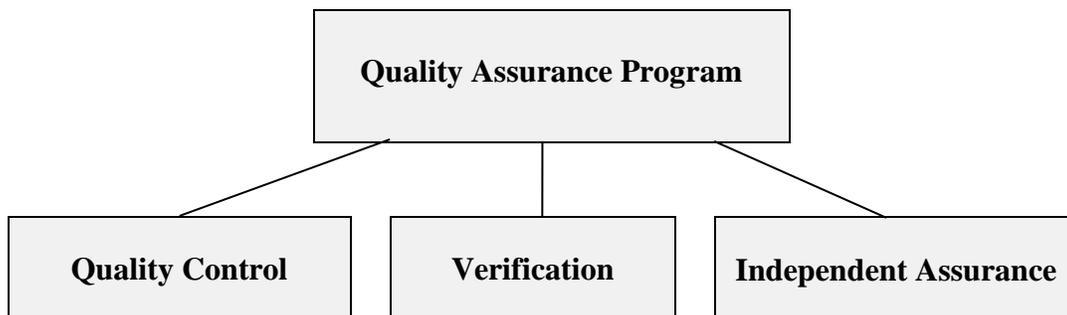
- To improve the overall quality of construction; and
- To place responsibility on the contractor for quality control in contracted work.

The success of the Quality Assurance program is dependent on three primary features. The first is the Laboratory Certification program, which is discussed in Section III of this document. The second is the Technician Certification program, which is discussed in Section IV, and the final feature is the specific product QC/QA testing plan detailed in Appendix C of this document.

Quality Assurance (QA)

Quality Assurance is defined as: *All those planned and systematic actions necessary to provide confidence that a product or service will satisfy given requirements for quality.*

The QA Program includes three separate and distinct sub-programs as illustrated below:



Quality Control (QC)

Quality Control is defined as: *All contractor/vendor operational techniques and activities that are performed or conducted to fulfill the contract requirements.*

The contractor is responsible for providing quality control sampling and testing, furnishing material of the quality specified, and furnishing QL levels during aggregate production, when required. The contractor's Quality Control technician must perform or observe the sampling operations. Testing operations will be performed by a Certified Technician unless the Training Program option is utilized (see Appendix H (Training Program) for details). The certified technician, who performs the sampling and testing procedures, must sign the testing documentation.

Contractor quality control tests will be used for acceptance only if verified by tests performed by an independent group (**LPA's QA**), except as required for projects where the Special Provisions calls out Contractor Quality Control Type D or E.

Small quantities of some materials may be accepted when requested by the contractor and approved by the Project Manager without following the normal Quality Control sampling and testing frequencies (see Section 4(B) of MFTP).

NOTE: ODOT will perform testing for all source/compliance tests. The LPA will perform testing for those non-field tested items associated with construction products (e.g. asphalt's, emulsions, tack, water, cement, lime, etc.).

Verification

Verification is defined as: *Sampling and testing performed to validate the quality of the product.*

Verification samples are taken randomly (minimum ten-percent of specified quality control frequency) and tested by an independent group (LPA QA) to verify that products meet required specification(s). Quality Control samples shall not be used for verification.

If the Contractor's QC testing is not used for acceptance, verification testing shall comply with the specified QC sampling and testing frequencies described in Section 4(D) or Section 5, as specified for each project.

Independent Assurance

Independent Assurance is defined as: *Activities that are an unbiased and independent evaluation of all the sampling and testing procedures used in the acceptance program.*

The Independent Assurance (IA) Program uses a combination approach requiring laboratory certification, technician certification, calibration checks of equipment, and for testing personnel, requires observation during sampling and testing and checking split samples of verification or QC tests. The ODOT Construction Section certifies quality control and quality assurance testing laboratories and technicians.

If the Contractor's QC testing is used for acceptance the Contractor's test results of split verification samples are compared to LPA QA lab test results for compliance using IA parameters. The LPA's QCCS performs random inspections of QC labs and technicians for compliance.

If the Contractor's QC testing is not used for acceptance, then the LPA's verification testing must be evaluated independently for all projects built on the NHS. IA inspection and observation will be performed on a project basis for FHWA funded Local Public Agency projects built on the NHS. The State Central Lab, if available or the LPA's independent lab results of split samples are compared to the LPA's acceptance testing for compliance using IA parameters. The **independent lab** performs random inspections of verification testing and technicians for compliance. IA testing of QA labs and observation and checks of QA testing personnel is not required for FHWA funded Local Agency projects built off of the NHS.

NOTE: The Quality Assurance Testing (both Verification and Independent Assurance) will be performed by a Quality Assurance Laboratory designated by the LPA in compliance with 23CRF637.

Quality Assurance Program Components

Third-Party Resolution

Third Party Resolution is used when QC testing is used for acceptance and the LPA's Quality Assurance test results conflict with ongoing Quality Control test results and when verification requirements are not met or the conflict cannot be resolved. Third-Party Resolution can be requested by either the Contractor or the Project Manager.

Third Party Resolution testing shall be performed by the State Central Lab (FHWA funded projects), if available, or a Dispute Resolution Laboratory selected by the LPA and which has not performed any other testing for the project materials in dispute. This is normally done by testing quality control production backup samples, but may include other resolution techniques or procedures as determined by the LPA PM.

The test result(s) of the Dispute Resolution Laboratory performing dispute resolution materials testing for any or all disputed test results will be considered the actual test results and will therefore be used for acceptance of the material.

Note: Third-Party Resolution is not required for projects for which Quality Control test results are not used for acceptance.

CERTIFICATION ADVISORY COMMITTEE

Technicians and Laboratories used for QC and QA must be certified per ODOT's certification program. The certification programs (both Technician and Laboratory Certifications) for ODOT's Quality Assurance program will be overseen by a Certification Advisory Committee. The purpose of this committee is to review and provide general oversight to the certification programs. The committee will be responsible for establishing policy as related to the certification programs and will also be responsible for reviewing allegations concerning abuse by technicians. The Certification Advisory Committee will perform other duties as required to successfully implement and continue the Certification Programs. A meeting of the committee may be called at any time by the Chair of the Certification Advisory Committee or by written request of at least two members of the Committee. A majority of the members of the Committee shall be present for transaction of official business.

Membership

Membership of the Certification Advisory Committee will include the following:

- ODOT Construction and Materials Engineer (Chair)
- ODOT Pavements Services Engineer
- ODOT Quality Assurance Engineer
- ODOT Structural Services Engineer
- ODOT Laboratory Services Manager
- APAO Executive Director or Representative
- OCAPA Executive Director or Representative
- AGC Heavy Highway Representative
- Industry "At Large" Representative (appointed by Committee)

Random Samples

The Quality Assurance Program is based on theoretical conditions and the application of statistical acceptance procedures. Sampling shall be by simple random, stratified random, or systematic means as specified.

To obtain a representative sample, a reliable system of random sampling shall be employed. Some work, like process control, lends itself quite well to the use of the Random Units Table and the Random Sample Location forms that ODOT has developed. ODOT TM 400 (Determining Random Sampling and Testing Locations) is also available to assist with Random Number determinations and test site locations. This is the preferred method to assure that the samples are representative and eliminate sampling bias. In other work, like Verification or Independent

Assurance, it may be difficult to apply random numbers to sample selection. In this case, it is imperative that the samples are taken at locations or times, which do not have an identifiable pattern, and are completely random and without bias.

Commercial Source Quality Control

The ODOT quality assurance program allows some freedom for commercial sources to establish their own quality control plan that is tailored to the operation of the specific commercial source. The commercial supplier is required to submit a written quality control plan to the appropriate Region Quality Assurance Coordinator for approval. All testing for the approved quality control plan is required to be performed by an ODOT certified technician in an ODOT certified laboratory. Specific details on Commercial Source Quality Control may be found in Appendix D.

II. ROLES AND RESPONSIBILITIES

Contractor

The contractor's responsibilities are to:

- Furnish a written quality control plan (See Appendix G, Pg. 60, for minimum requirements);
- Furnish and incorporate materials/products which are of the quality specified;
- Provide ODOT certified technicians and laboratories;
- Perform quality control of all materials/products used on LPA construction projects;
- Sample and test materials using appropriate devices and procedures;
- Furnish QL when required;
- Sample and provide splits to LPA upon request, witnessed by an LPA representative;
- Perform required tests on contractor's split of verification samples;
- Properly document, sign and deliver test results as required, on ODOT forms according to Section 3 criteria; and
- Retain splits of all QC samples until the PM determines that the split samples may be discarded.
- Retain all split portions of Verification samples until notified in writing by the PM to discard.

Project Manager (PM)

The Project Manager has the authority and responsibility to enforce the provisions of the contract. The PM's Quality Control Compliance Specialist (QCCS) is involved with the project QA activities and is experienced and certified in all areas of field testing and documentation. The QCCS is required to maintain certification in CAgt, CEBT, CAT 1, CDT and QCT. Certification in CAT II, CCT and CMDT are recommended.

The Project Manager is responsible to verify that:

- The project meets the requirements specified in the plans and specifications.
- All required tests are performed, documented, and submitted. The PM is also responsible to ensure that verification testing is accomplished.
- The contractor's QC program meets required standards. This is accomplished by performing inspections of contractor's personnel, testing procedures, and testing equipment per the parameters listed in Appendix "P" in Section IA. The contractor and Agency's Quality Assurance Laboratory is notified in writing within 5 working days of an IA/Verification sample's completion, as to which backup samples may be discarded or that an investigation is in progress. Upon the completion of an investigation inform the contractor, in writing, as to which backup samples may be discarded. Written notification will identify the Lot/Sublots, include the IA test results and if required the resolution of an IA investigation.

The PM, with the assistance of the QCCS, the QA lab and the project inspectors, is responsible to perform the following duties including, but not limited to:

- Maintain uniformity in construction and testing activities;
- Witness Sampling for IA and verification testing;
- Perform all required IA and verification testing;
- Properly document sampling and testing on ODOT forms according to Section 3 criteria;
- Verify calibration of all nuclear moisture density gauges used by the Contractor for QC and those used by the LPA for QA;
- Troubleshoot construction problems related to materials;
- Recommend changes to mix designs;
- Retain IA/Verification splits until no longer needed.
- Ensure third-party dispute resolution is provided, according to the QA program, when necessary.

III. LAB CERTIFICATION PROGRAM

OVERVIEW

The ODOT Construction Section (CS) developed this laboratory certification program to support the Oregon Department of Transportation's (ODOT) Quality Assurance Program for Construction Materials. This program recognizes three categories of laboratories that will test materials for ODOT and LPA construction projects: Quality Control, Quality Assurance, and Dispute Resolution. To ensure that laboratories consistently provide quality test results, they shall be certified according to this Program.

PROGRAM DESCRIPTION

1. Quality Control Laboratories

Quality control of construction materials is the responsibility of the contractor. Laboratories performing quality control testing may be the contractor's own, the material supplier's or an independent testing laboratory.

The ODOT Central Laboratory will certify all Quality Control Laboratories for those test methods necessary to perform Quality Control tests of construction materials for ODOT and LPA construction projects. An outline of the on-site inspection process and laboratory certification criteria is found in Appendix A. This certification will be valid for one year. If a laboratory's certification expires and the laboratory has a continued need to test materials for ODOT or LPA construction projects, the laboratory shall apply for re-certification.

This laboratory certification process is designed to provide a “snapshot” of the quality of a laboratory. The ODOT Central Laboratory or its authorized representative will examine the laboratory’s testing equipment for accuracy and conformance to specifications. If the laboratory’s equipment is properly calibrated and within specifications, and if the laboratory meets all other conditions specified in Appendix A, ODOT will certify the laboratory as competent and able to test materials for ODOT construction projects. Labs must be certified by ODOT to test materials for LPA construction projects.

2. Quality Assurance Laboratories

Quality assurance is the responsibility of the LPA. Quality Assurance Laboratories perform Independent Assurance (IA) and/or Verification tests in coordination with Quality Control Laboratories performing quality control tests of materials for LPA construction projects. This provides the LPA with an independent analysis of the quality control test results to evaluate the validity of the quality control tests..

Quality Assurance Laboratories for Local Public Agency projects may be the ODOT Central Laboratory, the Agency’s own lab or a contracted independent lab.

Quality Assurance Laboratories perform Independent Assurance (IA) and/or Verification tests during production of materials. For FHWA funded Local Public Agency projects, the lab performing the IA testing shall not be the same lab that performs the verification testing. These laboratories perform a portion of the tests that the Quality Control Laboratories perform. The quality control and quality assurance test results are compared to each other to determine the reliability of the quality control testing program.

The ODOT Central Laboratory will certify all Quality Assurance Laboratories for those test methods necessary to perform quality assurance tests of construction materials for construction projects. This certification will be valid for one year. If a laboratory’s certification expires and the laboratory has a continued need to test materials for construction projects, the laboratory shall apply for re-certification. An outline of the on-site inspection process and laboratory certification criteria is found in Appendix A.

This laboratory certification process is designed to provide not only a “snapshot” of the quality of a laboratory, but also an evaluation of the laboratory’s performance in maintaining quality and consistency. ODOT Central Laboratory inspectors will examine the laboratory’s testing equipment for accuracy and conformance to specification. In addition, the quality assurance laboratory is required to participate in the ODOT Central Materials Laboratory Proficiency Sample Program (see Appendix B). If the laboratory’s equipment is properly calibrated and within specifications, and if the laboratory meets all other conditions specified in Appendix A, then ODOT will certify the laboratory as competent and able to perform independent assurance and/or verification tests of materials for ODOT construction projects. This certification is also required for labs providing dispute resolution, independent assurance, and/or verification testing for Agency projects.

3. Dispute Resolution Laboratories

When Quality Control and Quality Assurance test results conflict and the conflict cannot be resolved; a neutral Dispute Resolution Laboratory will test the material in question. The test results of the Dispute Resolution Laboratory will decide the dispute.

The ODOT Central Laboratory or an ODOT certified lab selected by the LPA (for LPA projects) will perform all third party and dispute resolutions unless a potential for conflict of interest exists.

In the event that the ODOT Central Laboratory acts as the Quality Assurance laboratory, and that the dispute is therefore between the Quality Control Laboratory and ODOT Central Laboratory, the ODOT Central Laboratory will defer its dispute resolution duties to a certified laboratory agreed upon between the LPA and the Contractor.

The ODOT Central Laboratory shall certify dispute Resolution Laboratories., other than the ODOT Central Laboratory.

Any Laboratory which has run Independent Assurance, Verification or Quality Control testing on the material under dispute is considered to have a conflict of interest and shall not perform Dispute Resolution on its own tests.

Laboratory Decertification

A Quality Control or Quality Assurance Laboratory may have its entire certification or its certification for specific test methods revoked by ODOT if it is found to not conform to the specifications and standards of its ODOT certification. A laboratory that has had its certification revoked for a specific test method(s) may not test materials that require the use of such revoked test certification(s). A laboratory that has had its entire certification revoked shall promptly cease testing materials for Agency construction projects.

A laboratory that has had its certification partially or entirely revoked may seek reinstatement by demonstrating conformance to the ODOT Laboratory Inspection criteria (See appendix A).

In addition, any laboratory/company intentionally misrepresenting the status of their certification or falsifying test results will be subject to disciplinary action up to a one-year suspension of their certification. Any allegation regarding the practices of a certified laboratory will be made in writing to the Certification Advisory Committee. The Certification Advisory Committee will investigate the complaint and take appropriate disciplinary action. In all cases, the parties involved in the complaint will be provided an opportunity to appear before the committee before any actions are taken.

IV. TECHNICIAN CERTIFICATION PROGRAM

INTRODUCTION / BACKGROUND

The Quality Assurance Program will require all personnel and laboratories performing testing on LPA projects to be certified. The level of certification is dependent on the specific type of testing to be performed. The Certification Advisory Committee, described in Section I, of the QA Program, will provide approval and General oversight for the certification programs. Specific direction and administration of the individual certifications will be provided by ODOT unless other groups are specifically referenced in the description of the individual certifications.

The Oregon Department of Transportation is a member of the Western Alliance for Quality Transportation Construction (WAQTC), which consists of 11 western states committed to the quality of our transportation systems. WAQTC has developed a technician-training program, which is comprised of instructional, and student modules used to assist in the training process of material field-tested procedures. ODOT has adopted the training packages for all certifications except for ODOT specific certifications and those controlled by entities other than WAQTC such as QCT, CCT, CMTD and CAT II.

The purpose of the Technician Certification Program is to insure technicians performing testing have a minimum level of knowledge in the area of certification.

Technician Certifications

Following is a summary of the approved Technician Certifications currently in place. Initial certification, in any discipline, will be valid for a 3-year period, except CSTT, which is valid for a 6-year period. After the initial 3-year certification period has expired, the certification renewal period will be 5 years for all certifications, except CSTT, CCT, CMTD and Cat-II. CSTT will be valid for a 6-year period and CCT and Cat-II will be valid for a 3-year period. Recertification for CMTD is required every 2 years following the initial 3-year certification. The length and conditions of any extension will vary and are at the discretion of ODOT.

Certified Aggregate Technician (CAgT):

A CAgT performs a variety of tests on soils and aggregates including; sieve analysis, fracture, sand equivalency, and other tests. A CAgT also performs other duties as required by current specifications for soils and aggregate materials.

Certified Embankment and Base Technician (CEBT):

The CEBT performs testing of soils and aggregates for establishing the relative maximum density and optimum moisture for use in compaction testing of sub grade soils and aggregate bases. A CEBT also determines the Specific Gravities of aggregate.

Certified Density Technician (CDT):

A CDT performs in-place density testing of soils, aggregates, and asphalt mixtures using the nuclear density gauge. In addition to certification, a CDT must possess a current Radiation Safety Card issued by an approved source. For soil, soil aggregate mixtures, and aggregates a CDT determines percentages of coarse and fine material, performs one point testing and related calculations.

Certified Asphalt Technician I (CAT-I):

A CAT-I performs sampling and testing for HMAC and EAC mixtures including AC content, maximum specific gravity, sieve analysis, void measurements, and other tests and duties as required by current specifications.

Certified Asphalt Technician II (CAT-II):

A CAT-II is responsible for managing the volumetric properties of asphalt mixes by controlling plant operations, for troubleshooting HMAC sampling and testing processes, and for making appropriate adjustments to HMAC production and lay down procedures. **Certification at CAT-II level is contingent on having successfully completed the CAT-I certification phase at least once.**

Certified Mix Design Technician (CMDT):

A CMDT is responsible for preparing HMAC and EAC Mix Designs, including all material testing and data analysis necessary to properly complete a design. A CMDT prepares designs for both dense and open graded mixtures.

Quality Control Technician (QCT):

A QCT performs testing of fresh Portland cement concrete including sampling, concrete temperature, slump, unit weight, air content, and fabrication of specimens for strength testing and performs other duties including calculating cement content and water-cement ratio as required by specifications. QCT certification is obtained through the ACI Concrete Field Testing Technician - Grade 1 certification program, with the Oregon written Supplemental test, conducted by the Oregon Concrete and Aggregate Producers Association (OCAPA).

Concrete Control Technician (CCT):

A CCT is responsible for preparing concrete mix designs. Proportioning concrete mixtures to meet job requirements, and for making adjustments to the mix design as necessary to provide a concrete mixture of the quality required by specifications. A CCT certification is obtained through a training program conducted by OCAPA.

Concrete Strength Testing Technician (CSTT):

A CSTT is responsible for testing the compressive or flexural strength of hardened concrete cylinders or beams. The duties of a CSTT include proper capping of specimens (bonded and unbonded), correct operation of breaking device and visual evaluation of broken specimens. Also, the CSTT is responsible to insure the proper handling, mold removal, logging and curing of field fabricated samples upon arrival at the laboratory. A CSTT certification may be obtained through a program conducted by Oregon Chapter of the American Concrete Institute.

Who Must Be Certified?

All personnel responsible for performing testing, and reviewing test reports, required on projects, which the ODOT and LPA Quality Assurance Program applies must be certified. This requirement applies to project personnel working as technicians or fulfilling the role of a Quality Control Compliance Specialist for the State, the LPA, Contractors, or Consultants on such projects.

Certification Requirements

To obtain any of the above certifications, the technician will be required to pass a written and/or a practical test demonstrating a knowledge and understanding of how to perform the specific tests and of specifications applying to the material being tested. All tests shall be administered and evaluated only by evaluators approved by the Certification Advisory Committee Chair, or their designated representative.

To apply for the certification, the applicant will register either for one of the approved training classes, where the exam will be administered as part of the class, or submit an application to challenge the exam. The challenge applications will be submitted through the approved training program to facilitate scheduling. Appropriate fees will be charged for the challenge exams to cover scheduling, overhead and facility use. Applicants will be scheduled for examination through a cooperative effort between ODOT and the appropriate training program service provider.

All certifications shall be contingent upon the technicians signing a rights and responsibilities agreement. This agreement outlines the technician's rights and responsibilities along with the possible consequences of the abuse and/or neglect of these responsibilities. The technician will submit a signed agreement at the time they take the certification examination.

Examination Process

The Asphalt Paving Association of Oregon (APAO) and Oregon Concrete Aggregate Producers Association (OCAPA) currently perform the instructional phase, while ODOT maintains the certification and administration of the written and practical exam processes. The certification system is made up of three phases. Phase one - WAQTC written exam, phase two - ODOT written exam and phase three - combined ODOT and WAQTC performance exam.

During the exam process, only hand calculators are allowed, the use of computers is not permitted during any exam phase.

Challenge Process

A person may challenge the exam process if they feel that they have the knowledge and skills to be able to pass without attending formal training. If the person does not currently possess a certification for that specific discipline and fails any of the following mentioned examination events, then that person must attend the formal training for that certification. If the person currently possess a certification for that specific discipline and fails any of the following mentioned examination events, then that person may challenge the failed examination event for that certification a second time. If the person fails the challenged event a second time, then the person must attend formal training for that specific discipline.

WAQTC Written Examination

- a. Closed Book
 - b. Consists of multiple modules, depending on the needed certification
 - c. Each module consists of 5 questions with multiple choice, true or false, and required calculations.
 - d. Written exam time lines vary depending on the needed certification. 1 to 1 ½ hours is given to complete the exam.
- **ODOT Written Examination:**
 - a. Open Book
 - b. Consists of multiple choices, true or false, and essay questions related to test procedures as well as specifications and completion of various ODOT forms.
 - c. Written exam time lines vary depending on the needed certification. 3 to 3 ½ hours is given to complete the exam.
 - d. For CMTD certification, there are two written exams covering Dense and Open graded HMAC, EAC and Aggregate Treatment applications. 4 hours is allowed for the Dense HMAC exam and 2 hours for the Open HMAC, EAC and Aggregate Treatment exam.
 - **ODOT /WAQTC Combined Performance Examination**
 - a. Each participant will demonstrate proficiency in the designated test methods with prepared samples and will demonstrate the ability to apply specifications and ODOT specific requirements to the needed test and identify the quality of the material being tested.
 - b. The exam is open book but the technician may not use the performance exam checklist.
 - c. The performance examination for ODOT is performed in conjunction with the WAQTC performance exam. 4 ½ hours is given to complete the performance exam process with 4 hours actual lab time and ½ hour given to complete calculations. The performance exam answers are graded based on completion of the required tests, accuracy of computations, application of the correct specifications, and the results of computations meeting the

parameters set forth in the Independent Assurance Parameters section of the Quality Assurance Program.

- d. During the performance exam the examinee may be asked to explain various steps of a procedure to reduce the full test time.
- e. The performance exam checklist consists of yes and no blocks. In order to complete the checklist successfully, all of the yes blocks must be filled out.

In the event, a participant fails the first attempt; a second attempt is given, if time permits, and after the exam proctor explains the correct procedure. Anyone failing a test method on the performance exam may repeat that trial during the day of the performance exam, depending on the timelines and the type of test. Repeat trials will be allowed in not more than 50% of the total test methods in that performance exam. If the participant fails on the second attempt the performance exam will stop and the participant will have to re-take the exam at the scheduling convenience of the Agency.

- **Passing Score – Written**

- a. Initial exam (first attempt) WAQTC: An overall score of 70% with a minimum of 60% on any one-test method.
- b. Re-exam (second attempt) WAQTC: An initial exam overall score below 70% will require a re-exam on all test methods. An initial exam score above 70% overall, but below 60% on one or more test methods, will require a re-exam on only those test methods. In the case of one test method comprising the re-exam, the examinee must receive a score of 70%. In the case of more than one test method comprising the re-exam, the examinee must receive an overall score of 70% with a minimum of 60% on any one-test method.
- c. Initial exam (first attempt and second attempt) ODOT: An overall score of 70% is required to successfully complete the exam requirement.
- d. Initial exam (first attempt) for the QCT ODOT supplemental exam: An overall score of 80% is required to successfully complete the exam requirement. For the CCT and CMDT certification exams, an overall score of 75% is required to successfully complete the exam requirement.
- e. Re-exam (second attempt) for the ODOT QCT and CCT exam the participant must meet the same criteria as the Initial exam (first attempt).

- **Passing Score – Performance**

- a. All performance checklists must have 100% yes blanks checked and each test method must be performed within the designated time limit. Each examinee is allowed two attempts to complete procedures if time allows.
- b. First attempt: Performing all the required tests, application of correct specifications and meeting the Independent Assurance Parameters is required to receive a pass rating. The grading is based on pass/fail of all associated tests performed under the desired certification.
- c. Second attempt: The same criteria as the Initial exam must be met.

- d. For CMTD, an acceptable Level 2, 3 or 4 HMAC design must be submitted along with verification materials, as described in Section 6 of the most recent edition of the “Contractor Mix Design Guidelines for Asphalt Concrete”. A six-month period will be allowed for the mix design submittal from the date of the written exam.

Re-examination Policy – Written/Performance

Failure of any exam phase a second time will require attendance of the course for that qualification and passing the exam element failed on the second attempt if certification is still desired. In addition, on the date the certification process is started a technician will have 120 days to complete the exam requirements for the desired certification. If the exam requirements are not met within the 120-day period and certification is still desired the technician will be required to perform the entire exam process again.

Applicants with Disabilities or Special Needs

Applicants with a disability or those having special needs should notify the Certification Advisory Committee Chair, or their designee, at the time application is made of what appropriate accommodations need to be made so that these can be planned for.

Disclaimer

Certification of an individual by the ODOT Technician Certification Program indicates only that the individual has demonstrated a certain level of competence on a written and/or practical examination in a selected field of activity. ODOT may require this certification of individuals performing activities specified in work contracts or other activities. ODOT and the Certification Advisory Committee make no claims regarding the abilities or competence of certified individuals. Each individual or organization utilizing certified individuals must make its own independent judgment of the competence of certified individuals. ODOT specifically disclaims any responsibility for the actions, or the failure to act, of individuals who have been certified through the ODOT Technician Certification Program.

To obtain certification may involve hazardous materials, operations and equipment. This program does not purport to address all safety or regulation concerns associated with the use of the procedures used. It is the responsibility of the users to use and establish appropriate safety and health practices and determine the applicability of regulatory limitations.

Documentation of Certification

Upon the successful completion of the examination(s), the participant’s name, home address, and/or company affiliation is registered in the official registry of certified technicians for the appropriate certification. ODOT Construction Section maintains the official registry. It is accessible on the internet at the following address:

<http://highway.odot.state.or.us/cf/techcertDynamic/Index1.cfm>.

It is anticipated that many technicians will hold multiple certifications. Each certified technician is given a laminated wallet-size identification card, which indicates all areas of certification, and official letter(s) indicating certification(s) held.

Recertification

To remain current, a Certified Technician must obtain recertification before the expiration date of the certification. Recertification may only be obtained by passing the written and/or practical test required for that particular certification. A Certified Technician must apply for the individual certification for which they want to remain certified. The Certified Technician is responsible for scheduling his/her own written and/or practical comprehensive examination.

It should be noted that should a technician fail to successfully complete a Certification renewal in a specialty area, the technician will be considered disqualified in that area, only, until the requirements for Certification renewal have been successfully met, subject to the limitations set forth in this document.

Revocation or Suspension of Certification

The Certification Advisory Committee Chair for just cause may revoke technician Certifications at any time. Proposed revocations are sent to the individual in writing along with the individual's right to appeal the proposed revocation. A proposed revocation is effective upon receipt by the technician and will be affirmed, modified, or vacated following any appeal.

The reasons that certified technicians will be subject to revocation or suspension of their certifications are *negligence* or *abuse* of their responsibilities. The Certification Advisory Committee (CAC) may disqualify certified technicians for other reasons of just cause, which may or may not be specifically defined herein following the due process procedures outlined herein.

Negligence is unintentional deviations from approved procedures that may or may not cause erroneous results. The following penalties are guidelines for findings of *negligence*: The first finding of *negligence* will result in a letter of reprimand being sent to both the employee and the employer. Depending on the nature of the incident, the CAC could impose up to a 30 day suspension. The second significant incident during the certification period will result in the Quality Assurance Engineer (QAE) discussing the issue with the individual and their employer to establish a corrective action plan. Depending on the nature of the incident, the CAC could impose up to a 180 day suspension. The QAE will also notify the entire ODOT Quality Assurance staff of the issue. A third instance of neglect may result in permanent revocation of the Certification.

Abuse is knowingly deviating from approved procedures or when the technician should have known they were deviating from approved procedures. There are two levels of severity for *abuse*. For level 1 *abuse*: The first finding may result in up to a 180-day suspension all of the

Certifications of the individual. A second instance (within the certification period) would result in a minimum of 180-day suspension of all certifications.

For level 2 *abuse*: the first finding will result in a 1-year suspension of all Certifications of that individual. A second finding will result in permanent revocation of all Certifications.

Revocations or suspensions for *abuse* or *negligence* in one Certification area are considered revocations or suspensions in all Certifications held by the technician.

Allegations of *negligence* or *abuse* are made to the Quality Assurance Engineer (QAE) in writing. The allegations will contain the name, address, and signature of the individual(s) making the allegation. The QAE will investigate all allegations. The QAE will decide if the incident is significant to warrant review by the Certification Advisory Committee (CAC). If the incident is given to the CAC for review, then the accused and the individual(s) making the allegation are given the opportunity to appear before the CAC to present any appropriate information. Within a 60 day period, all involved parties will receive a report of the findings in writing. Any warranted penalties will be imposed in accordance with guidance contained herein and according to the guidelines outlined under the Technician Compliant Process (See Appendix F). Decisions regarding allegations of *negligence* or *abuse* may be appealed in writing to the Committee Chair. The Committee Chair will independently consider such written appeals but may rely on the advice and counsel of the Committee.

Because ODOT is a member of the Western Alliance for Quality Transportation Construction, the Certifications are honored by other member states. The Certification Advisory Committee will notify the other members of the WAQTC, or other participants in the TTQP, of anyone having a Certification revoked or suspended.

APPENDIX A

OREGON DEPARTMENT OF TRANSPORTATION CONSTRUCTION SECTION CENTRAL MATERIALS LABORATORY

ON-SITE LABORATORY INSPECTION CRITERIA FOR QUALITY CONTROL AND QUALITY ASSURANCE LABORATORIES

A laboratory desiring information and/or an application package for ODOT laboratory certification may contact the ODOT Central Laboratory at the following address:

Oregon Department of Transportation
Construction Section, Materials Laboratory
Attn: Lab Certification Coordinator
800 Airport Road SE
Salem, OR 97310-4798
Telephone (503) 986-3087

Laboratories requesting ODOT certification shall make arrangements to receive an on-site inspection. Forms will be included in the application package to facilitate the laboratory's response to this requirement.

NOTE: It is the responsibility of the requesting laboratory to have their lab clean, organized and in complete operating order at the time of inspection. All equipment must be readily available and accessible. The ODOT Laboratory Certification Team does not search for stowed equipment. In addition an authorized representative must be present at the time of inspection to answer questions or respond to identify and present equipment. Failure to meet this criterion or to find unorganized, unkempt facilities may result in a canceled inspection.

On-Site Inspection

The Lab Certification Inspector will visit each laboratory whose application for certification has been accepted. The laboratory inspector will evaluate the laboratory using criteria A through H listed below. A discussion of the criteria follows:

- A. **Requirement: The laboratory shall maintain facilities (fixed or mobile) for proper control of the laboratory environment.** This criterion is used to evaluate the laboratory's physical ability to provide an appropriate environment in which to test materials. General requirements include: the facility shall be physically able to function as a laboratory (e.g. adequate power, water, lighting, floor space etc.) and have the capability of maintaining temperatures that are specified in the test methods for which the laboratory is seeking certification.

- B. **Requirement:** **The laboratory shall maintain facilities for proper storage, handling, and conditioning of test specimens and samples.** This criterion is used to evaluate a laboratory's physical ability to store samples and keep them organized. The laboratory shall maintain separate areas on its premises to store samples and splits of samples in an organized manner so that samples are not lost or discarded and may be found at a future date. In addition, the laboratory shall have facilities for the conditioning of samples as required by any test method for which the laboratory seeks certification.
- C. **Requirement:** **Calibration certificates held by laboratories shall meet the requirements of ISO/IEC 17025 and shall include appropriate statements of uncertainty. Laboratories shall use accredited calibration service providers. The laboratory shall maintain necessary calibration equipment and reference standards.** A laboratory shall have, on hand, calibration and verification equipment necessary to ensure the accuracy of its equipment. Such equipment could include calibration weights for scales or balances; manometers for the verification of vacuum pumps; thermometers etc.
- D. **Requirement:** **The laboratory shall maintain equipment conforming to specification requirements necessary for the testing performed.** This criterion is used to ensure that the laboratory's testing equipment conforms to the specifications listed in the test methods for which the laboratory is seeking certification.
- E. **Requirement:** **The laboratory shall demonstrate adequate care when recording and processing data and test results.** This criterion is used to evaluate the laboratory's ability to produce accurate test reports. The laboratory shall have procedures in place that facilitate the timely and accurate recording of data and the ultimate accuracy of its test reports.
- F. **Requirement:** **The laboratory shall demonstrate proper techniques for selection, identifying, handling, conditioning, storing, and retaining test samples.** This criterion is similar to criteria B but is concerned with the laboratory's internal policies and procedures rather than its physical capabilities in regards to the above activities. The laboratory shall have policies and procedures in place to ensure that its personnel and technical staff have the ability to select, identify, handle, condition, store, and retain test samples as required by the test methods for which the laboratory is seeking certification.
- G. **Requirement:** The laboratory shall include the laboratory's name and address and the name(s) of the technician(s) performing the test(s) on their test reports. This criterion is used to ensure that the above information appears on the laboratory's test reports that are submitted to ODOT. In addition to the above, the technician(s) certification card number shall be entered on all test reports.

H. **Requirement:** The laboratory shall have on site at the time of inspection and during production operations, all equipment (except items listed as **mobile equipment**) necessary to perform the test methods for which they have requested certification. The ODOT Lab Certification inspection team has a Color Coded Tagging System, which identifies various lab equipment that has met the certification criterion. The unique Colored Tag is valid for a 1 year period and starts from the date of the Final Report. **(Note: Not all testing equipment is tagged; reference the appropriate test procedure to identify required equipment.)** **Mobile equipment** for additional test procedures may be added at a later date provided the following conditions are met:

- The laboratory must demonstrate adequate workspace and electrical system to operate required equipment.
- If equipment is new, they must provide copies of invoices that include the make, model and serial number of the equipment.
- If the equipment is rented or borrowed, it must come from another ODOT certified laboratory and provide the make, model and serial number as well as the number and color of the ODOT inspection tag.

Mobile Equipment

1. Ignition Oven
2. Gyrotory Compactor
3. Field concrete equipment

Preliminary Report

The ODOT Lab Certification Inspector will prepare a preliminary report of findings and present it to the laboratory manager at the conclusion of the on-site inspection. The preliminary inspection report will list all discrepancies for each test method in which the laboratory has requested certification. The inspector will discuss each discrepancy noted in the preliminary report with the laboratory manager in sufficient detail so that the laboratory manager understands the scope of the problem(s) and what corrective action is required in order to obtain certification for the test method(s) in question. When the inspector and the laboratory manager have covered all of the deficiencies, both parties will sign the preliminary report. These signatures indicate that both parties have read the report and understand its contents. The inspector will leave the original copy of the report with the laboratory manager and place a copy in the laboratory's permanent file.

The laboratory inspector will immediately (same or next day) FAX or hand deliver a copy of the report to the project manager and the region QA personnel for their files and general information.

Laboratories are expected to correct all deficiencies within thirty-days so that a certification may be issued. If a laboratory needs more than thirty-days to correct deficiencies, the laboratory shall notify the laboratory inspector, in writing, explaining why they need additional time. The laboratory will not be certified until all deficiencies are corrected.

If the ODOT Lab Certification Inspector within the thirty-days receives no response to the preliminary report allowed, then the laboratory will be immediately decertified until the deficiencies are corrected or a written response has been received.

Final Report

Once all of the deficiencies have been corrected the ODOT Lab Certification Inspector will prepare a final report of findings and mail it to the laboratory.

The laboratory inspector will mail copies of the final report to the project manager and the region QA office.

Certificate of Laboratory Certification

The ODOT Central Laboratory will prepare a Certificate of Laboratory Certification for a laboratory when the laboratory has met the requirements listed in Appendix A, and has corrected all deficiencies noted by the inspector. The certificate will be mailed to the laboratory with the final report of findings. The Certificate will include the type of certification, laboratory name, test methods the laboratory has been certified to perform, color of the inspection tag and the Construction Section Manager's signature. This Certificate is proof of a laboratory's ODOT certification for the listed test methods and may be presented as such to any ODOT project manager.

The laboratory inspector will mail copies of the Certification with the final report to the project manager and the region QA office.

Certificates of Laboratory Certification are valid for one-year from the date of the inspection.

Follow Up On-Site Inspections

If at any time during a laboratory's term of certification, the project manager or region QA personnel suspect that any of the contractor's laboratory equipment, conditions outlined under Requirement H or the laboratory building itself are out of specification, the project manager or region QA personnel may request an additional on-site inspection. The project manager or region QA personnel will contact the Lab Certification Inspector and schedule the follow up on-site inspection.

Laboratory Decertification

If the follow up on-site inspection reveals that the laboratory is deficient in one or more areas, the laboratory inspector will immediately decertify the laboratory for those test methods affected by the deficient equipment or facilities. The laboratory inspector will recertify the laboratory following correction of all deficiencies. A laboratory may not perform materials tests using test methods for which it has been decertified.

In addition, any laboratory/company intentionally misrepresenting the status of their certification or falsifying test results will be subject to disciplinary action up to a one-year suspension of their certification. Any allegations regarding the practices of a certified laboratory will be made in writing to the Certification Advisory Committee. The Certification Advisory Committee will investigate the complaint and decide on appropriate disciplinary action. In all cases, the parties involved in the complaint will be provided an opportunity to appear before the committee before any actions are taken.

APPENDIX B

**OREGON DEPARTMENT OF TRANSPORTATION
CONSTRUCTION SECTION
QUALITY ASSURANCE LABORATORY**

PROFICIENCY SAMPLE PROGRAM

The Proficiency sample program is optional for Local Public Agencies, except as administered by the ODOT Central Lab.

Proficiency sample testing is an additional factor used to evaluate the performance of a Quality Assurance (QA) laboratory and the Quality Assurance (QA) laboratory technicians. It provides information not otherwise available from the on-site inspection and a means of continued monitoring of laboratory performance. The ODOT Construction Section requires QA Laboratories and QA laboratory technicians to participate in this Proficiency Sample-testing Program. Participation includes testing all applicable samples, which are to be distributed and completed within the specified time frame. The resulting data is to be analyzed by the ODOT Quality Assurance Engineer.

Proficiency samples are distributed by Construction Section at annual intervals as outlined in the Proficiency Sample Testing Plan in Table 1 of this Appendix. The Construction Section will distribute a minimum of one set of samples as indicated in Table 1 for each of the QA laboratory technicians. The ODOT Central Laboratory and the QA laboratory technicians will perform the required testing listed in Table 1 on each set of samples. The distribution of proficiency samples is not intended to coincide with the on-site laboratory inspection. Proficiency Sample test results will be submitted to the Quality Assurance Engineer within 30 days of receipt of the sample.

A QA laboratory may be subject to decertification as described in Section 2 Appendix A Lab Certification Program. When a QA laboratory technician results are beyond two standard deviations of the grand average values, the Quality Assurance Coordinator (QAC) shall attempt to determine the reason for the discrepancies and report the findings and actions taken to the ODOT Quality Assurance Engineer (QAE) within thirty days of issuance of a final report. The adequacy of the QAC's response will be considered in preparing a report on certification and recertification. If the QA laboratory technician exceeds the two standard deviation limit on the next set of Proficiency Samples for the same test and is not able to provide the QAE with a satisfactory explanation for exceeding the limits; the QA laboratory technician will immediately perform a backup proficiency sample witnessed by the QAE or designated representative. If there is no resolution and the results of the backup sample exceed the two standard deviation limit their Technician Certification(s) for certifications affected by that procedure(s) will be suspended automatically for six months. Suspensions and written appeals are subject to review by the Certification Advisory Committee prior to implementation.

TABLE 1 – PROFICIENCY SAMPLE TESTING PLAN

January Distribution

TEST METHOD
SOIL & Aggregate Sample
Bulk Specific Gravity – AASHTO T85
Coarse Particulate correction – AASHTO T224
Max. Density – AASHTO T99 Aggregate Base
Max. Density – AASHTO T99 Soil
Sieve Analysis – AASHTO T27/11
Sand Equivalent – AASHTO T176
Fracture – AASHTO TP 61
Wood Particles – ODOT TM225
Elongated Pieces – ODOT TM229
HMAC Mixture Sample
Bulk Specific Gravity – AASHTO T166A
Max. Specific Gravity – AASHTO T209
AC Content by Incinerator – AASHTO T308
Mechanical Analysis of Extracted Aggregate- AASHTO T30
Fabrication of Gyratory Specimen – ODOT TM326

A laboratory may obtain additional information on the Construction Section’s proficiency-testing program by contacting the Construction Section at the following address:

Oregon Department of Transportation
Construction Section, Materials Laboratory
Attn: Quality Assurance Engineer
800 Airport Road S.E.
Salem, OR 97310
Telephone (503) 986-3061

APPENDIX C PRODUCT SPECIFIC QC/QA TESTING PLAN

The Quality Assurance Program consists of three distinct sub-programs; the Quality Control Program, the Verification Program and the Independent Assurance Program. This appendix provides specific details on how the all programs work together to assure specification materials are incorporated into ODOT and LPA projects. It also provides details on specific requirements of each of the programs for each of the materials, which are utilized on ODOT and LPA projects.

In general, contractor's quality control tests are obtained at the highest frequency. LPA verification tests are run usually on a frequency of 10% minimum, of the QC testing frequency. While the Independent Assurance program takes steps to assure the quality of both the QC and the verification test results.

ODOT or LPA will accept materials based on the contractors QC test results only if verified by the ODOT or LPA verification testing. Verification of QC test results will require all of the following conditions to be met:

1. The material meets the specified quality: both the Department's or the LPA's and the Contractor's split.
2. The split samples meet Independent Assurance parameters.
3. The Department's or the LPA's Verification test results compare reasonably to the ongoing Quality Control data.

If any of the above conditions are not met, an investigation will be conducted by the Project Managers office to determine whether to reject the material or if the material is suitable for the intended purpose according to section 150.25 and also what price adjustment might be applied. See Investigation Criteria for details and requirements.

Step 2 in the above conditions compares the contractors test results on the split verification sample to the agency results. The Independent Assurance Parameters to be used for the comparison are listed in Table 1 of this appendix.

The following pages detail the Investigation Criteria, Quality Control, Verification and Independent Assurance requirements for each of the specific materials used on ODOT and LPA projects.

Investigation Criteria

The intent of the investigation is to determine reasonable cause for the discrepancy and provide supporting documentation. Materials failing to meet the conditions outlined for Verification, Independent Assurance and prior Quality Control testing, potentially have an impact on the quality of the material produced or incorporated into the project.

Several resources are available to assist with the troubleshooting process and data collection. Appendix E, (Troubleshooting Guide) provides some guidance through the evaluation phase based on material discipline and the associated tests. The guide is an evaluation tool and is not necessarily a complete listing of all potential areas to be investigated.

The investigation and the resolution of the discrepancy shall be documented on form (734-4040) and at a minimum will contain the following information:

- Clearly explain the issue under investigation. Provide the bid item number, material description, test procedure or process in question, associated Quality Assurance testing reference's and date or timelines of the testing issue.
- Describe the steps taken to resolve the discrepancy and the associated information or test results gathered to support the findings.
- Provide a conclusion based on the findings.
- Describe recommendations or actions to be taken.
- Provide written notification to the PM, the QA lab and Quality Control entity upon completion of the investigation. Ensure a copy of the investigation is maintained in the project files.

TABLE 1
Independent Assurance (IA) Parameters
Maximum Allowable Differences

Gradation (Sieve Sizes)

Larger than No. 8	5%
No. 8	4%
No.10	4%
Larger than (No. 200) and smaller than (No. 10)	2%
No. 200 with targets 10.0% or less	1.0%
No. 200 with targets greater than 10.0%	1.5%

Asphalt Content 0.40%

Fracture 5%

Wood Particles 0.05%

Elongated Pieces 5:1 Ratio (2.0%) & 3:1 Ratio (4.0%)

Sand Equivalent 8 points

Moisture Content (Plant Mix Aggregate Base) 0.5%

Soil Curves - Maximum Density - D_f

<i>Density</i>	3.0 lbs/ft ³
<i>Moisture</i>	3.0%

Aggregate Base - Maximum Density - D_f

Density	3.0 lbs/ft ³
Moisture	2.0%

Maximum Specific Gravity (Rice T-209)

Standard (G_{mm})	0.020
Dryback ($_{SSD}$) "As required"	0.020

Bulk Specific Gravity (Lab fabricated specimens T-I66) 0.020

Maximum Specific Gravity (T-85) 0.032

Air Content of Concrete (T-152) 0.5%

Slump of Concrete (T-119) $\frac{3}{4}$ "

Temperature of Concrete (T-309) 3° F

Unit Weight of Concrete (T-121)

3.0 lbs/ft³

AGGREGATE PRODUCTION

<i>Quality Control</i>	<i>Verification</i>	<i>Independent Assurance</i>
Required	Required	Required

Quality Control

The ODOT Central Materials Laboratory will retain Quality Control of source/product compliance as stated in Section 4(A). The Contractor's QC technician shall sample the aggregates, place the sample in a proper container and label as specified in Section 4(C), complete *ODOT Sample Data Sheet* (Form 734-4000), and deliver to the PM.

The Contractor's QC technician shall establish a random sampling and testing program and submit it to the PM prior to the start of production.

The Contractor's QC technician shall perform Quality Control sampling and testing required to ensure a quality product at the frequencies indicated in Section 4(D) of MFTP. The Contractor shall deliver the test results to the PM by the middle of the following work shift.

Pre-produced aggregates shall be tested at the frequency applicable for the material and use as determined by the appropriate specifications(s) and Section 4(D) of the MFTP. (i.e. a 20,000 ton stockpile of aggregate base will require 10 QC tests and 1 QA test).

The Contractor is responsible for furnishing Quality Levels during aggregate production when specified. The Contractor's QC technician shall reject material that does not meet the specified quality and notify the PM of the disposition and quantities of those materials. All required tests, except for gradation, are considered pass/fail. Gradation is subject to statistical analysis as described in specifications Section 00165.

Backup samples for aggregates shall be a minimum of ½ the minimum mass shown in Table 1 of AASHTO T 2 for the appropriate Nominal Maximum size aggregate.

Verification

The LPA QA lab performs Verification tests, taken randomly, according to the Manual of Field Test Procedures Acceptance Guide (Section 4(D)). A split of the sample taken by QC will be given to the LPA QA lab for testing.

If Verification testing fails to meet the specifications, other than gradation, the LPA's QA lab will immediately notify the PM. The PM will evaluate the results and resolve the discrepancy.

If Verification test results indicate that a material is out of specification for gradation, the LPA's QA lab will notify the PM, who will determine if the stockpile QL meets the specifications. The PM will determine if the stockpile is acceptable.

Independent Assurance

All parties that test materials shall employ ODOT-certified technicians and use ODOT-certified laboratories.

The Contractor's QC technician shall test the Contractor's split of Verification samples and provide the results to the PM the next workday. The PM will verify that the Contractor's test results and the LPA's QA lab test results are within IA parameters.

If the Contractor's test results and the LPA's QA lab test results for Verification samples are not within IA parameters, the PM will evaluate the results and resolve the discrepancy. See Appendix E - Troubleshooting Guide.

EARTHWORK
Section 00330

ESTABLISHING MAXIMUM DENSITIES

<i>Quality Control</i>	<i>Verification</i>	<i>Independent Assurance</i>
Required	Not Required	Required

Quality Control

The Contractor's QC technician is responsible for establishing maximum densities and optimum moisture content for each unique soil type and soil/aggregate mixture incorporated into the project. *Backup samples shall be a minimum mass of 20 kg (45 lbs).*

Verification

None Required

Independent Assurance

All parties involved in the testing process shall employ ODOT-certified technicians and use ODOT-certified laboratories.

The LPA's QA lab will test the Contractor's split of the soil sample and provide the results to the PM within a 48 hr. period, based on the time the sample was split. The PM will verify that the Contractor's test results and the LPA's QA lab test results are within IA parameters.

If the Contractor's test results and the LPA's QA lab test results are not within IA parameters, the PM will evaluate the results and resolve the discrepancy.

COMPACTION

Quality Control	Verification	Independent Assurance
Required	Required	Required

Quality Control

The Contractor's QC technician shall establish a random sampling and testing program.

The Contractor's QC technician shall be on the project during performance of earthwork operations, as needed, to ensure that materials/products are in conformance with the specifications. The QC technician's duties include, but are not limited to, visual observation, sampling and testing. The Contractor shall rework all areas showing visual deflection. Sampling and testing procedures shall be performed at the frequencies indicated in Section 4(D) of the MFTP. The Contractor shall deliver the test results to the PM by the end of the work shift for T-99 Method A applications and within a 24 hr. period for T-99 Method D applications, based on the time the test information was collected in the field.

The Contractor's QC technician shall use the "one-point" method to establish the correct soil curve for each density test performed. If the soil does not match an established family of curves or a single curve, the Contractor shall establish a new curve for the soil, within a 48 hr. period, based on the time the sample was acquired. If use of the new maximum density curve results in a failing test, the Contractor shall take corrective action and retest until compaction is determined to meet the specifications, **prior to construction of a new lift.** *Backup samples shall be all uncontaminated portions of materials removed from beneath the gauge to perform the "one point".*

If the equipment or material changes, the QC technician shall verify by testing that the specified densities are attained.

Verification

The LPA's QA lab performs Verification tests, taken randomly, according to the Manual of Field Test Procedures Acceptance Guide (Section 4(D)).

If the soil tested, according to the "one-point" method, does not match the established curves, the Contractor shall establish a new curve from the soil at the test location and provide the test results within a 48 hr. period, based on the time the sample was acquired. Do not add new lifts until compaction is proven to meet the specified densities. The LPA's QA lab shall notify the contractor and PM of the test results by the end of the work shift for T-99 Method A applications and within a 24 hr. period for T-99 Method D applications, based on the time the test information was collected in the field.

If the density test fails, the Contractor shall identify the limits of failing compaction, take corrective action, and notify the PM. The PM will schedule a new Verification test. Do not add new lifts until the Verification tests demonstrate that specified densities exist.

Independent Assurance

All parties involved in the testing process shall employ ODOT-certified technicians, use ODOT-certified labs, and use ODOT-calibrated or calibration verified by ODOT, nuclear density gauge(s).

CONCRETE

Sections 00440, 00540, 00558, 00559, 00660, 00755, 00756

AGGREGATE PRODUCTION

<i>Quality Control</i>	<i>Verification</i>	<i>Independent Assurance</i>
Required	Required	Required
See Aggregate Production details, page 28.	See Aggregate Production details, page 28.	See Aggregate Production details, page 28.
Not required for commercial grade concrete	Not required for commercial grade concrete	Not required for commercial grade concrete

MIXTURE

<i>Quality Control</i>	<i>Verification</i>	<i>Independent Assurance</i>
Required	Required	Required

Quality Control

The Contractor's QC technician shall perform Quality Control sampling and testing required ensuring a quality product at the frequencies indicated in Section 4(D) of the MFTP. The Contractor shall deliver the test results, of the plastic properties of the concrete, to the PM by the end of the work shift. Concrete Strength test results shall be delivered to the PM within 24 hrs. after the specified break date.

The Contractor's Quality Control (QC) plan shall identify the method used for standard curing, the type of capping system used in the strength testing of concrete cylinders and the size of cylinders to be cast.

Verification (not required for Section 00440 mixtures)

The LPA's QA lab performs Verification tests, taken randomly, according to the Manual of Field Test Procedures Acceptance Guide (Section 4(D)). Cylinders cast shall be of the same size identified in the QC plan. Strength testing shall use the same capping methods identified in the QC plan. Cylinders cast for strength verification will be delivered to the LPA's QA lab for further testing.

If Verification testing fails to meet the specifications, the LPA's QA lab will immediately notify the PM. The PM will evaluate the results and resolve the discrepancy.

Independent Assurance

All parties involved in the testing process shall employ ODOT-certified technicians and use ODOT-certified laboratories.

The PM will perform random inspections to ensure that the contractor's Quality Control plan is followed.

The Contractor's QC technician shall test the same load and portion of load from which the Verification samples are taken. This testing will be for plastic properties and strength testing. QC technician shall immediately report the results of the plastic properties testing to the LPA's QA lab. The LPA's QA lab will verify that the contractor's plastic properties test results and the LPA's QA lab plastic properties test results are within IA parameters.

If the Contractor's plastic properties test results and the LPA's QA lab plastic properties test results for the Verification sample are not within IA parameters, the LPA's QA lab will evaluate the results, resolve the discrepancy and notify the PM of the resolution. The LPA's QA lab test results, of the plastic properties of the concrete, or the investigation of IA issues will be given to the PM by the end of the work shift, if an agency representative is available.

The Contractor's QC technician shall make and cure three (3) cylinders of the same size identified in the QC plan. Strength testing of the three concrete cylinders shall be in accordance with AASHTO T-22, using the same capping method identified in the QC plan. The PM shall compare the Contractor's results for these cylinders to the Verification cylinders and to the ongoing Quality Control. The PM shall resolve discrepancies.

Note: On a single truck placement when Verification/IA is performed by the LPA's QA lab the contractor's test results may be used for Normal Quality Control testing.

AGGREGATE BASE, SUBBASE, AND SHOULDERS
Section 00641

AGGREGATE PRODUCTION

Quality Control	Verification	Independent Assurance
Required	Required	Required
See Aggregate Production details, page 28.	See Aggregate Production details, page 28.	See Aggregate Production details, page 28.

ESTABLISHING MAXIMUM DENSITIES

Quality Control	Verification	Independent Assurance
Required	Not Required	Required

Quality Control

The Contractor's QC technician is responsible for establishing maximum densities and optimum moisture content for each unique aggregate mixture type incorporated into the project. *Backup samples shall be a minimum mass of 20 kg (45 lbs).*

Verification

None Required

Independent Assurance

All parties involved in the testing process shall employ ODOT-certified technicians and use ODOT-certified laboratories.

The LPA's QA lab will test the Contractor's split of the aggregate sample and provide the results to the PM the next day. The PM will verify that the Contractor's test results and the LPA's QA lab test results are within IA parameters.

If the Contractor's test results and the LPA's QA lab test results are not within IA parameters, the PM will evaluate the results and resolve the discrepancy.

AGGREGATE MIXTURE

Quality Control	Verification	Independent Assurance
Required	Required	Required

Quality Control

The Contractor's QC technician shall establish a random sampling and testing program and submit it to the PM prior to the start of production.

The Contractor's QC technician shall perform Quality Control sampling and testing required to ensure a quality product at the frequencies indicated in Section 4(D) of the MFTP. The Contractor shall deliver the test results to the PM by middle of the following work shift. *Backup samples shall be a minimum mass shown in Table 1 of T 255 / T 265 and kept in an airtight container.*

Verification

The LPA's QA lab performs Verification tests, taken randomly, according to the Manual of Field Test Procedures Acceptance Guide (Section 4(D)).

If the moisture content exceeds the limits according to specification, the Contractor shall, take corrective action, and notify the PM. The PM will schedule a new Verification test.

Independent Assurance

All parties that test materials shall employ ODOT-certified technicians and use ODOT-certified laboratories.

If the Contractors test results and the LPA's QA lab test results for Verification samples are not within IA parameters, the PM will evaluate the results and resolve the discrepancy. See Appendix E - Troubleshooting Guide.

COMPACTION

Quality Control	Verification	Independent Assurance
Required	Required	Required

Quality Control

The Contractor's QC technician shall establish a random sampling and testing program and submit it to the PM prior to the start of production.

The Contractor shall perform Quality Control sampling and testing required to ensure a quality product at the frequencies indicated in Section 4(D) of the MFTP. The Contractor shall deliver the test results to the PM on the same day the testing is performed.

The Contractor's QC technician shall also perform the following:

- Use the test procedures applicable for determination of the maximum density for this material indicated in Section 4(D) of the MFTP.
- Establish a rolling pattern to provide the specified compaction
- Stop placement if the specified densities are not met

Verification

The LPA's QA lab performs Verification tests, taken randomly, according to the Manual of Field Test Procedures Acceptance Guide (Section 4(D)).

If the density test fails, the Contractor shall identify the limits of failing compaction, take corrective action, and notify the PM. The PM will schedule a new Verification test. Do not add new lifts until the Verification test demonstrates that the specified densities exist.

Independent Assurance

All parties involved in the testing process shall employ ODOT-certified technicians, use ODOT-certified laboratories, and use ODOT-calibrated or calibration verified by ODOT, nuclear moisture density gauge(s).

EMULSIFIED ASPHALT PRODUCTS/MATERIALS
Sections 00710, 00712, 00715 and 00730

AGGREGATE PRODUCTION

<i>Quality Control</i>	<i>Verification</i>	<i>Independent Assurance</i>
Required	Required	Required
See Aggregate Production details, page 28.	See Aggregate Production details, page 28.	See Aggregate Production details, page 28.

EMULSIFIED ASPHALT CEMENT

<i>Quality Control</i>	<i>Verification</i>	<i>Independent Assurance</i>
Required	Not Required	Not Required

Quality Control

Sample all required materials as specified in Sections 4(C) and 4(D). Complete *ODOT Sample Data Sheet* (Form 734-4000), place in the proper containers and label as specified in Section 4(C), and deliver to the PM by the middle of the following work shift.

EMULSIFIED ASPHALT CONCRETE PAVEMENT (EAC)
Section 00735

AGGREGATE PRODUCTION

Quality Control	Verification	Independent Assurance
Required	Required	Required
See Aggregate Production details, page 28.	See Aggregate Production details, page 28.	See Aggregate Production details, page 28.

MIXTURE PRODUCTION

Quality Control	Verification	Independent Assurance
Required	Required	Required

Quality Control

The Contractor's QC technician shall establish a random sampling and testing program and submit it to the PM prior to the start of production.

The Contractor's QC technician shall perform Quality Control sampling and testing required ensuring a quality product at the frequencies indicated in Section 4(D) of the MFTP. The Contractor shall deliver the test results to the PM by the middle of the following work shift. *Backup samples for aggregates shall be a minimum of ½ the minimum mass shown in Table 1 of AASHTO T 2 for the appropriate Nominal Maximum size aggregate.*

The Contractor's QC technician is responsible for monitoring plant operation to ensure that specification materials are delivered to the project. Monitoring activities may include, but are not limited to, the following:

- Calibrate the asphalt plant
- Maintain an inventory of materials, including generated waste
- Control segregation in silo(s) and truck loading operations
- Reject any mixture that is visually defective. Inform the PM of the quantity and disposition of the rejected material
- Sample all required materials as specified in Sections 4(C) and 4(D), (e.g. liquid asphalt, emulsion, cement, tack, etc.), place in the proper container and label as specified in Section 4(C), complete *ODOT Sample Data Sheet* (Form 734-4000), and deliver to the PM by the middle of the following work shift.

Verification

The LPA's QA lab performs Verification tests, taken randomly, according to the Manual of Field Test Procedures Acceptance Guide (Section 4(D)). A split of the sample taken by QC will be given to the LPA's QA lab for testing.

If Verification testing fails to meet specifications, the LPA's QA lab will immediately notify the PM. The PM will evaluate the results and resolve the discrepancy.

Independent Assurance

All parties that test materials shall employ ODOT-certified technicians and use ODOT-certified laboratories.

The PM will perform random inspections to ensure that the Contractor's Quality Control plan is followed.

The Contractor's QC technician shall test the Contractor's split of Verification samples and provide the results to the PM the next day. The PM will verify that the Contractor's test results and the LPA's QA lab test results are within IA parameters.

If the Contractor's test results and the LPA's QA lab's test results for Verification samples are not within

IA parameters, the PM will evaluate the results and resolve the discrepancy. See Appendix E - Troubleshooting Guide.

COMPACTION

<i>Quality Control</i>	<i>Verification</i>	<i>Independent Assurance</i>
Not Required See specifications – 00735.46	Not Required	Not Required

HOT MIXED ASPHALT CONCRETE (HMAC)

Section 00745

AGGREGATE PRODUCTION

<i>Quality Control</i>	<i>Verification</i>	<i>Independent Assurance</i>
Required	Required	Required
See Aggregate Production details, page 28.	See Aggregate Production details, page 28.	See Aggregate Production details, page 28.

MIXTURE PRODUCTION

<i>Quality Control</i>	<i>Verification</i>	<i>Independent Assurance</i>
Required	Required	Required

Quality Control

The Contractor's QC technician shall establish a random sampling and testing program and submit it to the PM prior to the start of production.

The Contractor's QC technician shall perform Quality Control sampling and testing required to ensure a quality product at the frequencies indicated in Section 4(D) of the MFTP. The Contractor shall deliver the test results to the PM by the middle of the following work shift. *Backup samples shall be a minimum mass of 20 kg (45 lbs) or for Open Graded HMAC, accepted under the Cold Feed Method, a backup sample of ½ the minimum mass shown in Table 1 of AASHTO T 2 for the appropriate Nominal Maximum size aggregate can be used.*

The Contractor's QC technician is responsible for monitoring plant operation to ensure that specification materials are delivered to the project. Monitoring activities may include, but are not limited, to the following:

- Calibrate the asphalt plant
- Maintain an inventory of materials, including generated waste
- Control segregation in silo(s) and truck loading operations
- Monitor mix temperature
- Reject any mixture that is visually defective (e.g. graybacks, overheated, contamination, slumping loads etc.) Inform the PM of the disposition and quantity of rejected material
- Sample all required materials as specified in Sections 4(C) and 4(D) (e.g. liquid asphalt, emulsion, cement, tack, etc.), place in the proper container and label as specified in Section 4(C), complete *ODOT Sample Data Sheet* (Form 734-4000), and deliver to the PM by the middle of the following work shift.

Verification

The LPA's QA lab performs Verification tests, taken randomly, according to the Manual of Field Test Procedures Acceptance Guide (Section 4(D)). A split of the sample taken by QC will be given to the LPA's QA lab for testing.

If Verification testing fails to meet the specifications, the LPA's QA lab will immediately inform the PM. The PM will evaluate the results and resolve the discrepancy.

Independent Assurance

All parties that test materials shall employ ODOT-certified technicians and use ODOT-certified laboratories.

The PM will perform random inspections to ensure that the Contractor's Quality Control plan is followed.

The Contractor's QC technician shall test the Contractor's split of Verification samples and provide the results to the PM the next day. The PM will verify that the Contractor's test results and the LPA's QA lab test results are within IA parameters.

If the Contractor's test results and the LPA's QA lab test results for Verification samples are not within IA parameters, the PM will evaluate the results and resolve the discrepancy. See Appendix E - Troubleshooting Guide.

COMPACTION

Quality Control	Verification	Independent Assurance
Required	Required	Required

Quality Control

Dense Graded: The Contractor's QC technician shall establish a random sampling and testing program and submit it to the PM prior to the start of production.

The Contractor’s QC technician shall perform Quality Control sampling and testing required to ensure a quality product at the frequencies indicated in Section 4(D) of the MFTP. The Contractor shall deliver the test results to the PM on the same day the test is completed.

The Contractor's QC technician shall also perform the following:
(activities listed below are not exhaustive and are considered minimums).

- Establish a rolling pattern according to (TM-306) to provide the specified compaction
- Notify PM and CAT-II if rolling pattern is not being maintained
- Notify the PM and CAT-II if the specified densities are not achieved
- Monitor the mix temperature during laydown and compaction to keep the mix within the specifications
- Coordinate with the plant technician when changing lots
- Notify the LPA’s QA lab and PM when performing Core Correlations
- Notify the CAT-II of Control Strip Results
- Notify PM, CAT-I and CAT-II if any density results exceed 95%

Open Graded: Compaction to a specified density is not required. See 00745.49 in the specifications.

Verification

Dense Graded: The LPA’s QA lab performs Verification tests, taken randomly, according to the Manual of Field Test Procedures Acceptance Guide (Section 4(D)).

The LPA’s QA lab selects random numbers for the test locations within the contractor's subplot size. If Verification testing fails to meet the specifications, the LPA’s QA lab will immediately notify the PM.

The PM will initiate an investigation. If the investigation determines there is nonspecification material the PM will evaluate the test results using the Compaction Guidelines (Pg. 44) and perform resolution process as needed.

Open Graded: None Required
Independent Assurance

Dense Graded: All parties involved in the testing process shall employ ODOT-certified technicians, use ODOT-certified labs and use ODOT-calibrated or calibration verified by ODOT, nuclear density gauge(s).

The LPA's QA lab may elect to perform a gauge check as outlined in Appendix E and ODOT TM 304.

Open Graded: None Required

Failing HMAC Compaction Guidelines

1. QC Density Results Fail
 - a. Are the test results suitable for the intended use per Section 00150.25?
 - b. If yes, PM will apply test results to statistical acceptance procedures or Small Quantity guidelines according to Contract Requirements. Contractor should take corrective action.
 - c. If no, PM makes a determination regarding:
 - Methods of investigating, evaluating, and isolating nonspecification material
 - Application of appropriate corrective action and/or price adjustment for nonspecification material
2. QC Density Results Passing and QA Density Results Failing
 - a. PM determines the quantity of material represented by this verification. The PM should consider all material back to the last passing verification.
 - b. PM makes a determination regarding:
 - Methods of investigating, evaluating, and isolating nonspecification material
 - Application of appropriate corrective action and/or price adjustment for nonspecification material

Note: when cores are used, laboratory testing will be conducted by the Third Party Lab, under Third Party Dispute Resolution, according to the Quality Assurance Program. Third Party can be initiated by the PM or Contractor.

The PM can apply a price adjustment based on values entered into STATSPEC, or can use Form 734-3946 for a small number of sublots. The PM also has the ability per section 165.50(c) to isolate material that is shown to be nonspecification. Core density results or isolated nonspecification material, will be evaluated as a separate lot per section 165.40 or 165.50(c).

APPENDIX D

ODOT APPROVED COMMERCIAL AGGREGATE PRODUCT PROGRAM

ODOT Policy

For Aggregate Production Testing of Commercially available Aggregate Products

Commercial Aggregate Products—Aggregates not specifically manufactured and stockpiled for use on ODOT or Local public agency projects from a single source.

When requested by a supplier and the Region QAC agrees that it is to the benefit of the Department, a product may be put on the ODOT Approved Commercial Aggregate Product Program (OACAPP) using the following guidelines, or as modified and approved.

When a commercial aggregate supplier is proposing to produce an Aggregate Base Product(s) as an ODOT Approved Commercial Product, a plan may be submitted for performing AASHTO T 99. This plan shall replace the requirements in the FTMAG for that source.

A commercial aggregate supplier shall have an ODOT-certified QC technician sample, on a random basis, each stockpile being manufactured by the supplier and test the sample in an ODOT- certified laboratory. The commercial aggregate supplier shall submit to the Region QAC, in the Region the source is located, a Quality Control Plan. The Region QAC is responsible for reviewing and approving that Quality Control Plan. The products covered by the approved Quality Control Plan are classified as ODOT Approved Commercial Products.

The supplier's QC technician shall perform all sampling and testing for each product at the minimum frequencies shown in the Field Tested Materials Acceptance Guide (Section 4(D)). When materials are produced at very high production rates, the Region QAC may allow the minimum frequency to be altered after the supplier submits a written proposal to do so. The written proposal shall detail the proposed sampling and testing frequencies and shall describe how uniformity of production will be assured.

The supplier shall retain backup samples, for the previous 10 sublots, until the test results are verified by the Region QA group or as required by the Region QAC.

The supplier shall obtain under the supervision of the Region QAC, at the minimum required frequency as shown in section 4A of the MFTP, samples for product compliance and then the Region QAC shall submit them for testing at the Central Materials Laboratory.

The supplier shall send requests to waive tests, as allowed by the specifications, to the Region QAC, who will notify the appropriate people of any waivers granted. Waivers will apply to all projects which are supplied from that source.

When a waiver requires periodic testing by the supplier, the test results shall be sent to the Region QAC. All specified tests shall be performed for Verification and Independent Assurance Testing.

The supplier shall submit all requests for changes in production sizes to the Region QAC, who will obtain the approval of the discipline specific engineer. If approved, changes in produced sizes will apply to all projects which are supplied from that source.

The commercial supplier shall maintain files of all QC tests for each stockpile. It shall enter the test results into the ODOT Stat. Spec. program to calculate the Quality Level for each stockpile. The QL for gradation shall meet the requirements of Section 00165 of the Oregon Standard Specifications for Construction. Other required test results shall be shown in columns to the right in the program. The Region QAC may, with approval of the QAE, accept alternate means of statistical analysis for the supplier's product. The supplier shall deliver weekly or at an interval determined by the Region QAC, copies of the ongoing subplot test results, along with the ongoing QL (Quality Levels).

The supplier shall keep the Region QAC informed about production schedules so that Verification testing can be scheduled. The Region QA group will obtain Verification samples on a random basis and the split of this Verification sample shall be ran by the supplier's QC technician to test for Independent Assurance. The test results shall be available within 24 hours of the time of sampling. If the test results indicate that the produced material meets quality requirements and the results are within IA parameters, the QAC may allow all backup QC samples prior to the Verification sample to be discarded.

The Region QAC will randomly audit the QC files to verify that the Quality Levels reflect actual test results. The Region QAC will retain QL information for each stockpile along with Verification and IA test results. When requested by the Project Manager, the Region QAC will send a memo to the PM verifying and identifying what materials were produced under the ODOT APPROVED COMMERCIAL AGGREGATE PRODUCT PROGRAM and meet the required specifications.

If Verification test results, for tests other than gradation, do not meet the quality requirements, no material from the stockpile in question will be accepted until the problem has been resolved. The Region QAC will notify each PM, for the projects being supplied from that source, that the material in question shall not be used until the problem has been satisfactorily resolved. The resolution may involve rejection of the stockpile if the investigation confirms non-specification material. If the material test results do not meet IA parameters, the Region QAC will work with the supplier to resolve the problem.

If the supplier is not following their Quality Control Plan or product(s) fails to meet compliance testing requirements. The Region QAC may discontinue that suppliers Commercial Product status of those products effected. That product's status will be returned upon approval of the Region QAC.

The Region QAC will provide data to other Regions that are using material considered ODOT Approved Commercial Products.

APPENDIX E - TROUBLESHOOTING GUIDE

The following information is a guide to assist in the evaluation of discrepancies that commonly occur between Independent Assurance test results and Verification test results. This information is only a guide and is not necessarily a comprehensive list of all potential areas to be investigated. A best practice is to consult the LPA's QA lab for help early in the troubleshooting process.

General

1. Check if the technician signing the report is the person performing the tests.
2. Check that the technician performing the testing is certified.
3. Check that the lab and equipment used are ODOT certified.
4. Check that the proper procedures and methods were performed.
5. Check all mathematics.
6. Check Balances for accuracies and functionality.
7. Check constant mass calculations if available, comparing moistures can also indicate incomplete drying of sample.
8. Contact LPA's QA lab, their involvement can significantly reduce time spent troubleshooting and getting to resolution.

AGGREGATE TESTING

Gradation

1. Check sample size meets minimum requirements.
2. Inspect sieves for deformed wires or torn fabric.
3. Compare both test results for sample initial wet weights, initial dry weights, after wash dry weights, individual sieve weights and any tare weights if used. May point to a transposed or incorrectly recorded weight. May point to a splitting error.
4. Check sieve loss calculations.
5. Are there screens overloaded?
6. Check to see if the hand sieving procedure shows equipment operating correctly.
7. Check wash loss. May point to error in initial dry weight.
8. Have QC run QA split and observe. This action might indicate equipment, procedural discrepancies and /or splitting issues.
9. Compare results to ongoing Stat spec mean values.

WOODWASTE TEST

1. Is the drying method burning up wood?
2. Check equipment used for the procedure for correct size and state of repair.

FRACTURE TEST

1. Did both parties test the same? (Splitting the sample or not splitting the sample.)
2. If samples not split, do F+Q+N match closely to the retained mass(es) for gradation?
3. Do both parties have approximately the same amounts of F, Q, and N? If not may indicate a difference in interpretation of fractured particles.
4. Have QC run QA split and observe. This action might reveal procedural discrepancies and if results do not vary from originals, may indicate difference introduced during splitting.

FLAT AND ELONGATED TEST

1. Did both parties test the same? (Based on individual screens during gradation analysis and summed up or material recombined and split out with one evaluation)
2. Does MS closely match the retained masses for gradation (4.75mm (+ No. 4) material)
3. Proper caliper ratio used by both parties?
4. Have QC run QA split and observe. May indicate differences introduced during splitting.
5. Check caliper for tight fit between points when closed and smooth operation of armature.

SAND EQUIVALENT TEST

1. Compare Sand reading, if significant differences present this is an indication a under sized Tin or insufficient compacting effort when filling Tin.
2. Did both parties test at the same moisture content?
3. Are the methods of shaking suspending all fines?
4. Check lab temperatures and SE stock solution's age and the SE working solution's age and temperature. When in doubt observe technician prepare new batch of working solution.
5. Have QC run QA split of sample and observe procedures.
 - a. Look for vibration in surface where SE's tubes are set.
 - b. Were all the fines put into suspension?
 - c. Check shaking device for proper throw distance and proper number of strokes.
 - d. Check irrigation wand to insure good fluid flow from both openings.
 - e. Digital timer being used.
 - f. Weighted foot assembly in good condition and properly lowered.
 - g. Graduated marks properly read
6. Observe parties cleaning the +4.75mm (No. 4) material insuring fine particles are removed.
7. If results do not vary from originals, may point to a splitting issue.

SOIL/AGGREGATE RELATIVE MAXIMUM DENSITY AND OPTIMUM MOISTURE

1. Was the sample initially oven-dried (not allowed)? Separate samples at each point or re-compacted? Samples tested immediately or “marinated” moistures overnight?
2. Check plotting of data. Correct scale used. Dry densities plotted vs. dry basis moistures.
3. Check tare weights on molds/base plates. Collar removed?
4. Check mold volumes according to T 19, is there a significant difference from the standard volume?
5. Check surface on which samples were compacted. Is it unyielding surface?
6. Check constant mass on individual samples if available.
7. If available, check planning sheets for correct moisture addition calculations.
8. When held up to a light (or placed on a light table) do the two curve shapes match closely? Same shape, but one curve plots higher and to the left, indicates different compaction energy consistently applied to samples.
9. Was the passing no.4 or 3/4” material brushed off the retained no.4 or 3/4” material?
10. Have QC run a point at optimum moisture from their curve on the passing no.4 or 3/4” observe them perform the sample preparation and compaction procedure. Correct moisture computed and material properly mixed? Correct layers and layer heights? Hammer dropped from the correct height? Correct number of blows? Correct trimming and cleaning of mold? Moisture samples obtained correctly tested?

COARSE AGGREGATE BULK SPECIFIC GRAVITY TEST

1. Check thermometers.
2. How do values compare with pit history?
3. Were samples oven dried prior to soaking?
4. Do both parties have approximately the same GSA? This indicates the difference is probably in interpretation of the SSD point. If these results are very different this points to weight in water error, so was empty basket weighed in water or “zeroed” in water?
5. Screen over a nested 1/4” and No. 4 sieve. Significant material passing the No. 4 indicates an error in screening of material.
6. Have QC run QA sample and observe the sample preparation procedure.

COMPACTION OF SOILS & PROCESSED AGGREGATE

There are no IA parameters for compaction. If verification for compaction fails see the Specification specific section for how the QC is to resolve the failing area.

1. Is the correct curve being used? Is the correct density information being used?
2. Coarse Particles fit the rules for Method A or Method D? Fits curve used?
3. Observe testing in the field and look for the following: Random Representative location selected. Correct site preparation, drilling of the test hole, placement and seating of the gauge, data recorded.

4. For Soils. Observe proper fabrication of the one point and look for the following: Proper screening of material, in-place moisture measured prior to addition of additional moisture if needed, proper compaction of sample in correct mold, stable surface for compaction of one point?
5. Check Speedy moisture tester, balances and has density gauge been calibrated and calibration been verified by LPA's QA lab.

HMAC TESTING

The following should be considered in addition to the items listed in the Aggregate section.

IGNITION OVEN – AC CONTENT

1. Was the correct calibration factor used?
2. Were calibration samples batched properly and calculations performed correctly?
3. Was companion moisture used or sample dried prior to testing?
4. Sample have a clean burn? Sample achieve constant mass?
5. Check basket weights. Check sample size.
6. Check gradation results. The coarse half of a split may have lower asphalt content than the fine half.
7. Is the Oven set at the correct temperature?
8. Does the manufacture scale drift test meet parameters?
9. Was the thermometer removed prior to Initial and Final Weighing?
10. Were the initial and final weights taken at the same temperatures?
11. Was the mix moisture removed from the initial mass reading?

RICE GRAVITY TESTING

1. Check tare weights of pycnometers and lids.
2. Check sample sizes.
3. Check pycnometers calibration numbers.
4. Check equipment. Proper vacuum pressure? Calibrated thermometer?
5. Is the "dry back" procedure appropriate for this material?
6. Check gradation results. The coarse half of a split will have a higher Rice Gravity than the fine half.

BULK GRAVITY TESTING

1. Check sample heights.
2. Check measured volumes compared to heights. Tallest specimen should have largest volume.
3. Check equipment. Suspension apparatus hanging free? Calibrated thermometers? Tank overflow? Damp towel for SSD?
4. Check compaction equipment. Proper gyrations, pressure, angle of gyration, compaction temp?
5. Observe testing. Swap samples and observe performing procedure. Watch immersion and SSD procedures. Is basket and wire assembly free floating?

6. If results do not vary from originals, may point to a splitting or compaction error.
7. If results vary from originals, may point to a technician or equipment error.

HMAC DENSITY TESTING

There is not opportunity to rework HMAC; therefore, it is imperative to troubleshoot density testing issues immediately.

QC Best Practice

Once the gauge has been initially ODOT calibrated, identify a location that can act as a reference, this site should be an area of flat concrete. Set the gauge on the flat concrete surface and scribe a line around the case. Take a four-minute test on the site and document the result. It is a good idea to paint the density on the concrete so that others may use it too. Test the gauge at this site prior to going to the project to assure that the gauge is still reading consistently. Performing Standard Counts on project site before starting daily work is required and running another set at mid shift helps to maintain consistent readings.

Project Manager

1. Has the Contractor's gauge calibrated or verified by the Region QA group? Ask to see Cert.
2. Correct MAMD used? Core Correlation factor applied if needed?
3. Check the following correct; site preparation, placement and seating of the gauge, footprint marked, data recorded, rotation gauge.
4. Does the first subplot MDT match the JMF MDT within reasonable parameters? Specification is 50 kg/m^3 (3.0 lb/ft^3) this is really a large variation - check the asphalt content of the mixture.
5. If compaction is low, are there sufficient rollers of proper weight to achieve compaction? Does compaction correlate with Voids i.e. high voids low compaction?
6. Is the mix tender? Seek help from LPA's QA lab.
7. Is rolling compacting the whole panel, not just the center? Consistent with Control Strip?
8. Is the lay down temperature correct according to the JMF or has temperature changed during production? Has there been a substantial change in lift thickness?
9. Is weather a factor (colder, wetter, or windy)?
10. Is the existing surface being paved on in question? I.e. paving over open graded HMAC, PCC surfaces or extremely distressed existing pavement.
11. Does Coring need to be performed to validate in-place compaction? Call the LPA's QA lab for guidance.

If any problems are found that cannot be resolved, the inspector or QCCS should contact the LPA's QA lab immediately.

QA

QA is to verify compaction using separate, randomly selected sites. There is no direct comparison Independent Assurance parameter for nuclear density testing.

2. Periodically during the construction, perform counts on the LPA's QA lab calibration blocks in the backscatter position.
3. On the project, choose one or two sites at random and perform the normal tests on these sites with both the QC and QA gauges. The average for each gauge when compared to the other should be within 2 lb/ft³.
4. If the difference between the two gauges is greater than 2 lb/ft³, the Contractor's QC technician should rerun the tests while the LPA's QA lab QAT observes.
5. If the two gauges are not in agreement, re-standardize both gauges and re-shoot the location two shots in the same direction. If the gauges still do not compare take both gauges back to the LPA's QA lab calibration blocks and check their calibration and follow TM 304.
6. If either gauge is out of calibration, recalibrate prior to project testing.
7. If the gauges are in calibration. Core Correlation should be performed to remove gauge differences.
8. The Project Manager and LPA's QA lab should work together to resolve QC sublots brought into question by Verification results.

Plastic Concrete Testing

General For All Concrete Tests

1. Was the test started within prescribed time limits of obtaining the sample?
2. Were the QA and QC samples taken from the same portion of the load?
3. Was the sample adequately recombined if taken from two parts of the load?
4. Was the concrete covered if ambient conditions were adverse?
5. Was all equipment used within specification/tolerance, clean and damp prior to test?
6. Was excess water removed from the sampling container prior to obtaining the sample?

Slump (T-119)

1. Once the test was started was it completed in the allotted 2 ½ minutes and immediately measured?
2. Does Equipment meet specification?
3. Tamping rod w/hemispherical tip
4. Flat, rigid, non-absorbent base, level and on a surface free of vibration or disturbance (not a warped water damaged piece of plywood)
5. Cone that is free of dents, rust damage and concrete build up on the inside
6. Correct amount of layers and quantity/volume in each layer?
7. Was each layer rodded 25 times extending into the preceding layer?
8. On the top layer, was a head kept above the top of the cone at all times?
9. Was the excess concrete cleaned away from the base of the cone prior to lifting?
10. Was the cone pulled too fast/slow?
11. Was the cone pulled straight with no twisting or lateral movement?
12. Was the measurement reading taken from the displaced original center?

Note: If mix has 1 ½ inch or larger aggregate, it must be removed by the wet sieve method prior to performing the test.

Air Content (AASHTO T-152)

1. Was the test started within 5 minutes of obtaining the sample?
2. Has the air meter gauge been calibrated within the last three months?

NOTE: The air meter calibration can be checked in the field.

3. Was the bowl filled in approximately equal 1/3 layers?
4. Was each layer rodded 25 times extending into the preceding layer?

5. Were the sides of the bowl tapped 10 to 15 times with a mallet after each layer had been rodded?
6. Was the cover seal moistened and seated properly on the bowl?
7. Was water injected into the petcocks and meter rocked until no air bubbles appeared?
8. Was air pumped into the initial air chamber until it passed the initial pressure setting (as determined in the calibration process) and allowed to cool? Was any air noted seeping out of open petcocks at this time?
9. Was initial gauge adjusted to initial air pressure before opening main air valve?
10. Were the sides of the bowl tapped “smartly” during release of main air valve?
11. During release of main air valve was there any air leaking out the sides due to an incomplete seal?

Temperature (AASHTO T-309)

1. Has the measuring device been calibrated or verified for accuracy within the last year?
2. Was there adequate concrete cover around the measuring device sensor?
3. Was the concrete pressed around the measuring device at the surface?
4. Was the temperature recorded after a minimum of 2 minutes and the measuring device allowed to stabilize?

Unit Weight (AASHTO T-121)

Since the unit weight test is usually performed in conjunction with the air content test, see steps 3, 4 and 5 under the air content portion of this guide.

1. Check math
2. Was the dry mass of the measure accurately recorded?
3. Has the measure’s volume been accurately calibrated?
4. Was a strike off plate used to create a smooth surface free of voids and level with the rim?
5. Is the scale accurate? Cross check QA and QC scales to field verify accurate measurement.

APPENDIX F

OREGON DEPARTMENT OF TRANSPORTATION CONSTRUCTION SECTION

TECHNICIAN COMPLAINT PROCESS

The Oregon Department of Transportation's Technician Certification program is intended to assure qualified personnel are performing all materials testing for ODOT construction projects. In addition to certified technicians, the department needs a means to address concerns that are raised regarding those technicians not following approved procedures. The Technician Complaint Process will provide guidance on how to deal with these concerns. It should be understood that the intent of the process is to resolve differences of opinion on appropriate procedures at the lowest possible level. Technicians are encouraged to work together to resolve any differences they might have. Only when those issues cannot be resolved at the project level should they be raised to the level of filling an official complaint. It should be understood that in no way is the formal complaint process intended to remove any authority the Project Manager may have under an existing contract.

Any individual may file a complaint regarding testing procedures or practices. The first step when filling a complaint is to decide whether the issue is a case of "Neglect" or "Abuse". "Neglect" is unintentional deviations from approved procedures. "Abuse" *Abuse* is knowingly deviating from approved procedures or when the technician should have known they were deviating from approved procedures. The appropriate process for dealing with the issue is followed after a decision is made on the type of offence. Below is the processes for dealing with both Abuse and Neglect:

Complaint Process for Abuse

Because abuse is defined as intentional, the process for dealing with instances of abuse will be more formal and penalties more severe than for instances of neglect.

Step 1: If abuse is suspected, the issue shall be raised immediately to the ODOT Quality Assurance Engineer (QAE). The QAE will investigate the issue and make a preliminary determination on whether it actually is abuse or neglect. If the issue is determined to be abuse, move to step 2 below. If it is determined to actually be a case of neglect, move to step 1 of the process for dealing with neglect.

Step 2: The QAE will gather information regarding the incident from both the technician involved as well as the individual filing the complaint. The QAE will review the information and determine whether the incident is significant to warrant review by the Certification Advisory Committee (CAC). This review will be completed within 60 days of receipt of the complaint.

If the incident is determined to be “significant” the issue will be put on the agenda for the next CAC meeting.

Both the technician and the individual filling the complaint will be invited to attend the meeting to present any appropriate information. Insignificant issues will be handled directly by the QAE and a summary of the incident will be submitted to the CAC for their review.

Step 3: The CAC will determine the merits of the complaint and also the severity level of the abuse. Abuse will be identified as one of two different levels of severity.

Level 1 being identified as the least severe form of abuse. This level is identified as knowingly deviating from approved procedures or when the technician should have known they were deviating from approved procedures. The key component for Level 1 Abuse is there is no misrepresentation the quality of material being incorporated in the project. This level of abuse could result in up to a 180 day suspension of all certifications held by the technician. The exact duration of the suspension will be set by the CAC depending on the circumstances encountered. A second instance (within the certification period) of Level 1 abuse would result in a minimum 180 day suspension of all certifications.

Level 2 abuse is much more severe. The distinguishing component of Level 2 Abuse is misrepresentation of the quality of material being tested. This level of abuse will be dealt with by a 1-year suspension of all certifications for the technician. A second instance of level 2 abuse will result in permanent revocation of all certifications.

In all cases, the CAC will conduct the investigation into the allegations and make a recommendation to the ODOT Construction Engineer as to appropriate sanctions against the technician. All final decisions regarding suspension of certifications will be up to the ODOT Construction Engineer.

Complaint Process for Neglect

Again, neglect is much less severe than abuse and individuals are encouraged to resolve their differences at the project level so the project can continue forward in a positive fashion. The complaint process for neglect is intended primarily to allow a means of tracking the types of problems being encountered and also to look out for technicians who seem to have repeated instances of neglect.

Step 1: When an individual discovers a significant problem with a technician’s procedures or testing process, that individual will personally point out the concern to the technician. The two individuals will work together to try to resolve the issue. They may need to refer to the Manual of Field Test Procedures or other contract documents to verify proper procedures.

If the two can agree on corrective action, the issue can be resolved at their level. If not, the Region QAC should be contacted for clarification. If discrepancies on correct procedures still exist, the issue will be brought to the ODOT Quality Assurance Engineer (QAE) for resolution.

Step 2: Once the problem is resolved, the individual who discovered the problem will send a short memo to the QAE describing the issue and the resolution.

The QAE will maintain a file of these incidents. Depending on the severity of the issue, the QAE may send a letter of reprimand to the technician and their employer and the CAC could impose up to a 30 day suspension.

Step 3: If a second significant incident is reported within the certification period for a specific technician, the QAE will discuss the issues with the technician and their employer and establish a corrective action plan to help the technician avoid further complaints. Depending on the nature of the incident, the CAC could impose up to a 180 day suspension. In addition, the CAC could require the technician to attend additional training and retake the particular certification exam before reinstatement as a certified technician. The QAE will also send out notice to all ODOT Quality Assurance staff of the issue. This notification is intended to help put ODOT staff on notice of particular problems being encountered.

Step 4: If a third instance of neglect is reported within the certification period, the specific technician and his/her employer must meet with representatives from the Certification Advisory Committee (CAC) to discuss the issues. The technician will be responsible for providing a plan of how they will correct their deficiencies and assure no further instances will occur. The CAC may gather further information to substantiate the claims. The CAC will review the information and could impose up to permanent revocation of the certification in question.

It should be noted that because of the potential for repeated offences of neglect, the CAC could at any point in the process make a determination that the successive instances no longer fit as neglect, but because of the repeated nature of an offense, may become an instance of abuse. If this occurs, the issue would be dealt with through the complaint process for abuse.

APPENDIX G

Contractor Quality Control Plan

This plan is intended to provide a description of the personnel involved in the testing activities and identify the system or process for material Quality Control. The Quality Control Plan must contain at a minimum the following information.

- Include: Project Name, Contract Number and date of anticipated use and author of submitted plan.
- Provide office telephone, cellular phone & fax numbers for contractor's superintendent & quality control manager.
- Describe personnel & methods to deliver accurate, legible & complete test results to designated agency representative, within required time limits.
- Designate who will provide required QL analysis.
- Describe location and methods for backup sample storage.
- Provide random numbers and include examples of your method for applying, to provide representative samples.
- Provide Technician and Lab Certifications for all equipment, laboratories, & technicians used to perform testing on and offsite for the project.
- Provide current Scale License and Certification for all weighting devices used on the project. Identify the location of the scales and type of scale i.e. platform, silo etc
- For every material that has tolerances or limits for tests listed in the Manual of Field Test Procedures, provide:
 - Bid item & Specification Section number(s) for product to be used.
 - Source and supplier of material
 - Proposed production rate, methods & source of testing
 - Anticipated earliest date of use
- For each material supplier & subcontractor, provide:
 - Company name, address, & physical location.
 - Quality control contact name and telephone #.
 - Location, type, & quantity of materials to be used.

APPENDIX H

Training Program

The use of a training program is encouraged to develop future technicians, but must be closely monitored. Sampling and testing by a non-certified technician may be permitted, if monitored by a certified technician. The process is for development and exposure to testing procedures prior to obtaining formal certification. This training program is not intended to extend the workforce. A non-certified technician may not be in a training program for more than six (6) months for any given certification. A written training plan shall be submitted to the QAE for review and approval prior to implementation.

The plan at minimum shall contain the following information:

- The company name, and geographic location where the mentoring will be performed,
- Identify by name the non certified technician being proposed for the training program.
- Anticipated dates in a training capacity, prior to obtaining certification.
- Identify the certifications for which the non-certified technician is training for.
- Identify which test procedures by name and number will be performed by the technician-in-training.
- Identify by name and certification number and provide a resume of the certified technician responsible for performing the role of Mentoring Technician. The Mentoring Technician shall have a minimum of four (4) years' experience as an ODOT certified Technician in the specific discipline(s) applicable to the training of the non-certified technician identified above. The Mentoring Technician may have a maximum of two technicians-in-training at any given time.
- A Training Plan, which outlines how the technician-in-training will be trained and monitored for each procedure.

- Training documentation will include, at a minimum, for each technician-in-training:
 - A separate file with a copy of the training plan
 - A training log that shows; the date, content, and format of training provided, the dates and times which the technician-in-training was performing testing for ODOT project(s). The diary should also note whether or not the work was observed and to what extent. Each entry must be initialed by the Mentoring Technician and the technician-in-training.
 - Copies of the completed test forms
 - Copies of verification tests

The training plan will be reviewed to determine compliance with the guidelines provided above and to ensure that adequate training is provided to the technician-in-training and monitoring is sufficient to ensure the quality of work performed and compliance with ODOT's Quality

Assurance Program. Monitoring the technician-in-training is a key element in the training plan and will be weighed heavily in ODOT's review of the proposed training plan.

For purposes of this program, monitoring is defined as the direct visual observation of the technician-in-training while performing testing and reviewing all paperwork.

It is expected that monitoring the work of the technician-in-training will be conducted over the life of the training plan.

All test results will require signatures from both parties (certified technician and non-certified technician). The Mentoring Technician responsible for the training and mentoring of the non-certified technician is directly responsible for assuring that all work meets the requirements of the QA program and is complete, accurate and submitted within appropriate timelines. Acts of negligence or abuse by the Technician-in-Training, as defined in Section 2 of the MFTP, may be grounds for suspension or revocation of the Mentoring Technicians certification(s) as deemed appropriate by the Certification Advisory Committee.

ODOT, through the QAE reserves the right to rescind training plan approval at any time.

Appendix I

Parameters For Agency Verification of Contractor QC Program

Tasks performed by the Project Manager's Office to verify that the Contractor's QC program meets the required standards –

- 1) Verify technician and lab certification for all equipment, laboratories and technicians used to perform testing for the project prior to work starting
- 2) Verify current scale license and certification for all weighting devices used on the project
- 3) Verify the Contractor is delivering the required test results to the Agency in a timely manner.
- 4) Verify that the testing results from QA verify the test results from QC
- 5) Perform the Quality Level Analysis, if required (Section 00165.40(c))
- 6) Verify Contractor is using appropriate locations and methods for backup sample storage
- 7) Review all testing results from the project
- 8) Verify testing results for aggregate production that is used on the project
- 9) During the progress of the work, perform random inspections of Contractor personnel to make sure that certified personnel are responsible for the testing
- 10) Observing testing in the lab and in the field on a random basis
- 11) Verify that the Quality Compliance Certificates for nonfield-tested material delivered to the project meet specification (Section 00165.35(b))
- 12) Verify that the Certificate of Origin of Steel Materials is completed for the project, as required (Section 00165.35(d))
- 13) Verify that the Contractor QC plan meets the minimum requirements of Appendix G