

5.01 INDEPENDENT ASSURANCE PROGRAM5.01.01 Scope

- A. The FHWA, in accordance with Title 23, of the Code of Federal Regulations, Part 637, requires that all states develop a procedure for qualifying all testing personnel and laboratories used in acceptance decisions for Federal aid on projects on the National Highway System.
- B. The Michigan Department of Transportation's (MDOT) Independent Assurance Program consists of two parts: Independent Assurance Test Procedures (5.02) and the Laboratory and Technician Qualification Programs (5.03).
- C. Qualified sampling and testing personnel, other than those performing the Quality Assurance (QA) sampling and testing, should perform the Independent Assurance (IA) tests. Likewise, equipment other than that used for QA should be used for IA sampling and testing.
- D. MDOT uses a system approach for its Independent Assurance Program. The IAT testing frequency for all testers and equipment is based on time. The purpose is to cover all the testers and equipment over a period of one year.
- E. The MDOT Laboratory and Technicians Qualification Programs (5.03) contain criteria and guidelines for establishing and implementing a quality management system for use by construction materials laboratories. The essential elements of the laboratory quality systems include setting up and implementing policies regarding equipment maintenance and calibration, technician qualification and continued training, test results and document control, corrective action in case of nonconforming work, and participation in proficiency sample or inter-laboratory comparison testing Program(s). The areas covered by the program are: Hot Mix Asphalt, Concrete, Aggregate, and Aggregate Density.

5.02 INDEPENDENT ASSURANCE TEST (IAT) PROCEDURES5.02.01. Scope

- A. Independent assurance samples and tests (IATs) are one aspect of this program. IAT results are not used directly for determining the quality and acceptability of the materials and workmanship on a project, but serve as checks on the reliability of the results obtained in project acceptance sampling and testing.
- B. The requirement for conducting IATs extends only to those federal aid projects on National Highway System routes.
- C. The IAT program requirements apply to all persons (testers) conducting acceptance sampling and testing on covered projects. This includes MDOT technicians, consultant construction engineering personnel conducting acceptance testing as MDOT representatives, and local agency technicians or consultants.
- D. The IAT program covers HMA mixtures, concrete, aggregates, and soil and HMA density.
- E. These procedures provide a minimum framework on which to base independent sampling and testing frequencies. Testers may have a wide range of experience and abilities. Their performance should be carefully monitored through review of project test reports and IATs, with frequencies of IATs adjusted to fit the program needs.

5.02.02. Construction Field Services (CFS) Division Responsibilities

- A. CFS provides assistance to the regions by maintaining Independent Assurance Testing procedures for each of the four areas requiring IATs.
- B. CFS *technical coordinators* review IAT reports, assist in solving problems and compile annual reports of the number of IATs conducted, the number of discrepancies, trends, and areas for improvements. Technical coordinators are selected from the following areas of CFS:
 - Soil and HMA Density - Density Technology Unit
 - Concrete - Field Engineering
 - Aggregate - Aggregate Quality Control
 - HMA Mixtures - Bituminous Services Unit
- C. The CFS technical coordinators will work with the statewide coordinator to summarize their findings, including a section that describes the nature of unsatisfactory IAT's and the corrective measures to be taken to reduce them, and include these in the annual IAT report to FHWA.
- D. A *statewide coordinator* is appointed by CFS and is responsible for compiling a comprehensive annual IAT report for distribution to the regions and FHWA.

5.02.03. Region Responsibilities

- A. *IAT coordinators* are appointed by the region or TSC. Within the constraints of the IAT program, it is the responsibility of the IAT coordinator and the Construction/Project Engineer to determine the need for tests and to designate appropriate personnel to conduct the IAT. The IAT coordinators have the following responsibilities for the program.
1. Review IAT reports in a timely manner and identify problem areas, identify trends, and make recommendations for improvement.
 2. Review the program periodically with the CFS technical coordinators.
 3. Ensure that equipment is checked as required and that this is noted on the IAT reports.
 4. Notify appropriate Engineer if an individual refuses to participate in an IAT.

5.02.04. Location of IAT

- A. Conduct the IAT on the jobsite while the tester is in the process of running normal acceptance testing for job control. A key part of the IAT is witnessing the sampling to determine if proper procedures are being followed. Carefully check the calibration and condition of sampling and testing equipment used.

5.02.05. IAT Technician

- A. The region/TSC IAT coordinator will assign appropriate personnel to conduct IATs. IATs should be conducted by technicians not normally involved in the acceptance testing for the project. At the discretion of the IAT coordinator, exceptions may be made due to circumstances such as remoteness of the project or staffing limitations. Details concerning the qualifications of the IAT technician are included in the following IAT program areas.

5.02.06. Review of IAT Results

- A. IAT test results are sent to the region/TSC IAT coordinator who will forward originals to the Construction/Project Engineer and copies to the appropriate CFS technical coordinators. Unless stated otherwise in these procedures, it is the responsibility of the region/TSC IAT coordinator to investigate unsatisfactory IATs, determine the cause, and take corrective action. Any corrective action should be well documented for the project file with copies sent to the appropriate CFS technical coordinator. Unsatisfactory IATs on local agency projects should be brought to the attention of the engineer in charge of the project. Detailed guidelines for evaluation of IAT results are included in the appropriate IAT program areas. However, failure to demonstrate the following will result in an unsatisfactory IAT.
1. Proper equipment to conduct sampling and testing.
 2. Equipment properly calibrated and in good working order.
 3. Sampling and testing conducted according to prescribed MDOT methods.

4. Willingness to participate in an IAT. (Indicate refusal in the remarks section of the IAT report.)

5.02.07. HMA Mixtures IAT Program

A. Qualifications of HMA Mixtures IAT Technician

1. At a minimum, the HMA IAT Technician must have successfully completed the QC/QA Certification Course currently approved by MDOT.

B. Conducting HMA Mixture IATs

1. One IAT, per test procedure, per HMA testing technician, per year is required. The IAT must be conducted early in the construction season and early in the acceptance testing process so deficiencies in testing or equipment can be reconciled.
2. Tests covered by the HMA mixtures are listed in Section 5.02.07.C. An IAT for a Marshall testing protocol is not acceptable for a person that will be performing Superpave testing and vice versa.
3. The IAT sample is obtained at the same time, location, and manner as the quality assurance sample for the project. The sample size will be twice the size of the typical quality assurance sample. The sampling will be performed by a qualified sampling technician.
4. The qualified sampling technician will split the IAT sample. Split the sample before it cools down to avoid the need for reheating one portion of the specimen twice. Both portions of the sample will be brought to the designated MDOT region HMA laboratory. The HMA testing technician, whom the IAT is being performed on, will test one portion of the sample (the field sample) in the same manner as the quality assurance samples for the project.
5. Equipment or procedural errors observed by the IAT technician during the IAT test will be noted on Form 1843. The IAT technician will make recommendation for pass/fail.
6. The IAT Technician will submit, in a timely manner, the field sample test result(s) with the proper identification and the remaining portion of the IAT split sample to the CFS Division's HMA testing laboratory (the laboratory sample).
7. The laboratory and field sample test results will be tabulated by the CFS HMA technical coordinator using Form 1842 and transmitted to the Construction/Project Engineer, HMA testing technician, IAT technician, region/TSC IAT coordinator, and Statewide HMA technical coordinator.
8. All IAT results will be reviewed by the CFS HMA Technical Services Unit. When an unsatisfactory test is reported, the Construction/Project Engineer, IAT technician, and region/TSC IAT coordinator will be notified by telephone or e-mail as soon as possible. This notification will be documented on Form 1842.

- C. Evaluating HMA Mixture IAT Results - In addition to the requirements in Section 5.02.06, the following limits should be used when evaluating HMA mixture independent assurance tests. All deviations outside these ranges are considered unsatisfactory and require action.

HMA TEST	UNSATISFACTORY DEVIATION
Asphalt Contents (MTM 325)	varying by more than 0.5 percent
Aggregate Gradation	
1 inch to 3/8 inch sieve	± 5.0 percent
#4 to #8 sieve	± 4.0 percent
#16 to #50 sieve	± 3.0 percent
#100 to #200 sieve	± 1.0 percent
Crushed Content	varying by more than 15 percent
Maximum Theoretical Specific Gravity	varying by more than ± 0.019
Marshall Bulk Specific Gravity	varying by more than ± 0.026
Gyratory Bulk Specific Gravity @ N _{DESIGN}	varying by more than ± 0.020
NOTE: If it is apparent that inadequate or no inspection is being provided by the responsible tester, an unsatisfactory IAT should be reported with an explanation in the remarks section.	

5.02.08. Concrete IAT Program

A. Qualifications of Concrete IAT Technician

- IAT Technicians must be certified, as appropriate, and experienced with concrete acceptance testing.
- IATs for prestressed/precast concrete will be conducted and evaluated by Operations Field Services Division, Structural Fabrication Unit personnel. Copies of the IAT report will be sent to the region/TSC IAT Coordinator in which the fabrication plant is located and where the precast and prestressed concrete members will be used.

B. Conducting Concrete IATs

- One IAT, per test procedure, as applicable, per concrete testing technician, per year is required. The IAT must be conducted early in the construction season and early in the acceptance testing process so deficiencies in testing or equipment can be reconciled.
- Covered tests are those listed in 5.02.08.C

3. The IAT technician will witness sampling of fresh concrete and observe the tester performing the slump and air tests. An occasional comparison slump and air test should be performed by the IAT technician on separate equipment as a check on the acceptance test equipment.
4. A minimum of two cylinders; cast at the same time from the same source and cured under similar conditions should be used for the concrete compressive strength IAT. The cylinders should be at least 28-days old. The IAT technician will observe the tester break at least one cylinder using a compression machine that is used for quality assurance testing at the laboratory where the tester works. An occasional comparison compression test (cylinder break) should be run by the IAT technician preferably on separate equipment as a check on acceptance test equipment.
5. Technicians conducting acceptance tests on prestressed/precast concrete members must also be checked on prestressed strand tensioning calculations and preparing concrete cylinders.

C. Evaluating Concrete IAT Results

1. The requirements listed in section 5.02.06 must be met for a satisfactory IAT. Additionally, the limits shown in the table below are used to evaluate concrete independent assurance tests.
2. If the IAT result is unsatisfactory, the IAT technician will explain to the tester why the test was unsatisfactory and how it can be corrected. Every effort should be made to correct equipment or procedural problems at this time. The IAT should then be repeated until the problem is corrected and a satisfactory test is completed.
3. If unsatisfactory tests continue, the IAT coordinator will consult the region or TSC for action.

CONCRETE TEST	UNSATISFACTORY DEVIATION
Slump	varies more than 1 inch from comparison test results
Air content	varies more than 1 percent from comparison test results
Compressive Strength	varies more than 5 percent from comparison test results
NOTE: If it is apparent that inadequate or no inspection is being provided by the responsible tester, an unsatisfactory IAT should be reported with an explanation in the remarks section.	

4. All deviations outside these ranges will result in an unsatisfactory IAT.

5.02.09. Aggregate IAT Program

A. Qualifications of Aggregate IAT Technician

1. IAT Technicians must be a Michigan Certified Aggregate Technician (MCAT) and experienced with aggregate acceptance testing. Technician must be certified Level I or II, as appropriate, for the level of the tests being conducted.

B. Conducting Aggregate IATs

1. One IAT, per test procedure, per aggregate testing technician, per year is required. The IAT must be conducted early in the construction season and early in the acceptance testing process so deficiencies in testing or equipment can be reconciled.
2. Covered tests are those listed in 5.02.09.C
3. The IAT sample will be split, with one portion of the split tested by the technician running the acceptance tests. The IAT split sample should be tested on different equipment and reported within five days on Form 504.
4. The test results of the acceptance sample and the IAT split are sent to the IAT coordinator who will forward copies to the Construction/Project Engineer and the CFS, Aggregate Quality Control Group.

C. Evaluating Aggregate IAT Results

1. The requirements listed in section 5.02.06 must be met for a satisfactory IAT. Additionally, the limits shown in the table below are used to evaluate aggregate independent assurance tests.
2. If the IAT result is unsatisfactory, the IAT technician will explain to the tester why the test was unsatisfactory and how it can be corrected. Every effort should be made to correct equipment or procedural problems at this time. The IAT should then be repeated until the problem is corrected and a satisfactory test is completed.
3. If unsatisfactory tests continue, the IAT coordinator will consult the region or TSC for action.

AGGREGATE TYPE and TEST	UNSATISFACTORY DEVIATION
FINE AGGREGATE	
Gradation	Greater than 5 percent difference any sieve
Fineness Modulus	Greater than 0.1 difference
Loss by Washing	Greater than 0.8 percent difference
COARSE AGGREGATE	
Gradation	Greater than 5 percent difference any sieve
Deleterious	Greater than 1.5 percent difference
Loss by Washing	Greater than 0.6 percent difference
DENSE-GRADED and GRANULAR MATERIALS	
Gradation	Greater than 5 percent difference any sieve
Deleterious (HMA Top Course)	Greater than 3 percent difference
Loss by Washing (23A, Class IIA, Class III)	Greater than 2 percent difference
Loss by Washing (all other)	Greater than 1 percent difference
Crushed	Greater than 15 percent difference

4. All deviations outside these ranges will result in an unsatisfactory IAT.

5.02.10. Soil and HMA Density IAT Program

A. Qualifications of Density IAT Technician

1. IAT Technicians must be certified, as appropriate, and experienced with density acceptance testing.
2. Soil and HMA Density IATs are usually conducted by the Area Density Specialist.
3. CFS Density Technology Unit personnel will also conduct IATs.

B. Conducting Soil and HMA Density IATs

1. Soil and HMA Density IATs consist of witnessing the tester run in-place density test(s) and establish a maximum density.
2. One IAT, per test procedure, as applicable, per density testing technician, per year is required. The IAT must be conducted early in the construction season and early in the acceptance testing process so deficiencies in testing or equipment can be reconciled.
3. The following tests may be witnessed during a soil and HMA density IAT:
 - Speedy Moisture Tester
 - T-99 (1 Point)
 - Michigan Cone (1 Point)
 - Michigan Modified T-180
 - Nuclear Density Gauge
4. If density testing is performed with equipment or methods not found in the MDOT Density Testing and Inspection Manual, the IAT must be listed as "unacceptable" with an explanation provided in the remark section. Contact the CFS Soil and HMA Density technical coordinator for advice on resolving this issue.
5. Record witnessed IATs on Form 0509 and distribute copies as noted on the form. The form must be signed by the IAT technician.

C. Evaluating Soil and HMA Density IAT Results

1. The requirements listed in section 5.02.06 must be met for a satisfactory IAT.
2. If the IAT result is unsatisfactory, the IAT technician will explain to the tester why the test was unsatisfactory and how it can be corrected. Every effort should be made to correct equipment or procedural problems at this time. The IAT should then be repeated until the problem is corrected and a satisfactory test is completed.
3. If unsatisfactory tests continue, the IAT coordinator will consult the region or TSC for action.

5.03 LABORATORY AND TECHNICIAN QUALIFICATION PROGRAMS

5.03.01. Hot Mix Asphalt (HMA)

A. HMA Quality Assurance (QA) Laboratory

1. QA Laboratory Qualification Process – Title 23, of the Code of Federal Regulations, Part 637, states that all states develop a procedure for qualifying all testing personnel and laboratories used in acceptance decisions for Federal aid on projects on the National Highway System.
2. The Michigan Department of Transportation (MDOT) Lansing Construction Field Services (CFS) Laboratory shall be American Association of State Highway and Transportation Officials (AASHTO) accredited in applicable HMA test procedures. A qualified laboratory must meet the following requirements to work on any MDOT project:
 - a. QA laboratories will be assessed by AASHTO Materials Research Laboratory (AMRL). The AMRL assessments will follow the AMRL regional cycle (currently every 18 months).

*Note 1: The AMRL assessment is not for accreditation but for process and equipment reviews– See **Appendix A: Minimum Test Methods Required for Quality Control/Quality Assurance QC/QA Laboratory Qualification** for minimum requirements.*

- b. QA laboratories must meet the minimum requirements of AASHTO R-18 documents with regard to the Quality System Manual (QSM). The AASHTO R-18 requirements will be applicable, at a minimum, to the test procedures listed in **Appendix A**.
3. QA laboratories must be evaluated by the MDOT CFS staff annually to ensure compliance with the requirements of the AASHTO R-18 document. Record of the evaluation will be included in the QA laboratories' QSM.
4. The MDOT Lansing CFS must conduct yearly HMA Round Robin for all QA & Quality Control (QC) testing laboratories.
 - a. The results of the Round Robin will be compared to specific tolerance requirements. If test tolerances are not met, the testing processes and equipment will be reviewed and discussed. If a determination explaining the differences cannot be found, a second Round Robin sample will be run at any laboratory that did not verify.
 - b. If the results of the second Round Robin sample are not within the required tolerances, Central Materials Laboratory staff will review testing procedures, equipment, and processes to determine the cause of failure to verify.
 - c. The laboratory must participate and successfully complete the Round Robin as it is one of the requirements to be considered a qualified laboratory.

- d. The CFS Round Robin must be completed prior to the region Round Robin.
 - e. QA laboratories will be identified on the Round Robin report whereas QC laboratories will be provided discreet identification numbers upon request.
5. QA laboratories must employ qualified technicians.
- B. HMA QC Laboratory
1. QC laboratories must meet the following minimum criteria in order to perform testing on any MDOT project:
 - a. QC laboratories must meet the minimum requirements of AASHTO R-18 document with regard to the QSM. The AASHTO R-18 requirements will be applicable, at a minimum, to the test procedures listed in **Appendix A**.
 - b. QC laboratories must be evaluated by an internal/external source annually to ensure compliance with the requirements of the AASHTO R-18 document. Record of the evaluation will be included in the QC laboratory's QSM.
 - c. QC laboratories must employ qualified technicians.
 - d. QC laboratories must participate and successfully complete the MDOT CFS HMA Round Robin. This requirement applies to ALL laboratories that provide QC and/or local acceptance. See **Section 5.03.01.A.4** of this document for more information on the MDOT CFS HMA Round Robin.
- C. HMA Qualified Technicians
1. HMA Qualified Technicians must obtain and maintain the following:
 - a. HMA QA Technicians:
 1. Technicians performing QA on HMA must become certified and maintain their certification through a program approved by the MDOT. The current MDOT approved HMA technician certification program is being administered at Ferris State University – QC/QA Technician Certification Program.
 2. Technicians must be evaluated on a yearly basis using an internal and/or external source. The Independent Assurance Testing (IAT) process located in *MDOT's Materials Quality Assurance Procedures Manual (MQAPM)* will be used for this evaluation. A copy of the technician evaluation will be included in the QA Laboratory's QSM.

- b. HMA QC Technicians:
 - 1. Technicians performing QC on HMA must become certified and maintain their certification through a program approved by the MDOT. The current MDOT approved HMA technician certification program is being administered at Ferris State University – QC/QA Technician Certification Program.
 - 2. HMA QC Technicians must be evaluated on a yearly basis using an internal and/or external source.
 - a. The checklist in the **Qualified Hot Mix Testing** will be completed when evaluating a technician. A copy of the technician evaluation will be included in the QC Laboratory's QSM. It is the responsibility of the technician to have a copy of this evaluation available at any QC laboratory in which he/she is working.

OR

- b. The IAT process located in *MDOT's MQAPM* can be used for this evaluation.

D. Maintaining Records

- 1. The MDOT Lansing CFS shall maintain a database to include the following information for QA/QC HMA testing facilities:
 - a. Laboratory name.
 - b. Last AMRL assessment date. (Required for QA laboratories only.)
 - c. Previous AMRL assessment date. (Required for QA laboratories only.)
 - d. AMRL Proficiency date. (Required for QA laboratories only.)
 - e. Internal/External evaluation date.
 - f. Round Robin date.
- 2. The MDOT Lansing CFS shall maintain a database to include the following information for QC/QA HMA technicians:
 - a. HMA certification number.
 - b. Expiration date.
 - c. QA IAT date.
 - d. QC technician evaluation.

3. It is the responsibility of the laboratory supervisor or the individual QC/QA technician to supply the MDOT Lansing CFS with the necessary information to keep the databases updated.
 4. The MDOT Lansing CFS will annually review databases and inform the laboratory supervisor and/or individual QC/QA technician of any deficiencies or required corrective actions.
- E. Disqualification of Laboratories & Technicians
1. QC/QA Laboratories
 - a. It will be the responsibility of the MDOT Lansing CFS to maintain up-to-date information on the program thereby ensuring that requirements of this document have been adequately met.
 1. Deficiencies will be reported to the MDOT Statewide Quality System Engineer, laboratory supervisor, or applicable technician.
 - b. Failure to correct a deficiency within a 20 working day period will result in notification of the facility deficiency to the Engineer of CFS. The notification will include a recommendation of up to, and including, disqualification from testing on MDOT projects.
 - c. Upon correcting all deficiencies, a laboratory can be reinstated by the Engineer of CFS to resume testing on MDOT projects.
 2. QC/QA Technicians
 - a. Falsifying Data – Permanent removal for testing on MDOT projects. Reinstatement cannot be considered.
 - b. Failure to meet the requirements of MDOT's IAT program or a laboratory internal/external review.
 - c. Failure to obtain recertification through a program approved by MDOT.
 - d. Upon correcting all deficiencies, a technician can be reinstated by the Engineer of CFS to resume testing on MDOT projects.

Appendix A**MINIMUM TEST METHODS REQUIRED FOR QC/QA LABORATORY QUALIFICATION**

TEST METHOD	AASHTO, ASTM, MTM ¹	AMRL Laboratory Assessment	AMRL Proficiency Testing	Internal Review / IAT ³
Reducing Samples of Hot Mix	HMA Production Manual			√
Quantitative Extraction of Bitumen from Bituminous Paving Mixtures (Method E)	T164, D2172, MTM 325	√	√	√
Bulk Specific Gravity of Compacted Bituminous Mixtures using Saturated Surface-Dry Specimens	T166, D2726, MTM 315	√	√	√
Sieve Analysis of Fine and Coarse Aggregate ²	T27, C136 MTM 109	√	√	√
Mechanical Analysis of Extracted Aggregate ²	T30, D5444, MTM 311	√	√	√
Maximum Specific Gravity of Bituminous Paving Mixtures	T209, D2041, MTM 314	√	√	√
Asphalt Content by Ignition Method	T308, MTM 319	√	√	√
Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures	T 269, D3203	√	√	√
Preparing and Determining the Density of HMA Specimens by Means of the SHRP Gyration Compactor	T 312, D6925, MTM 315	√	√	√

The current Michigan Test Method (MTM) shall be used during internal reviews. If an MTM is not available, use the appropriate AASHTO or American Society for Testing and Materials (ASTM) as indicated in the applicable Special Provisions.

- ¹: The current/latest versions of AASHTO/MTM/ASTM test procedures will apply. For AMRL laboratory assessment and proficiency testing, the test method will be determined by the MDOT Lansing CFS HMA Unit.
- ²: For AMRL laboratory assessment, either method can be reviewed to satisfy the requirements for Sieve Analysis.
- ³: Current Michigan MTM/IAT checklists shall be used for documentation of the review.

5.03.02 Concrete

A. Concrete Quality Assurance (QA) Laboratory

1. QA Laboratory Qualification Process – Title 23, of the Code of Federal Regulations, Part 637, states that all States develop a procedure for qualifying all testing personnel and laboratories used in acceptance decisions for Federal aid projects on the National Highway System.
2. The Michigan Department of Transportation (MDOT) Central Construction Field Services (CFS) laboratory must maintain American Association of State Highway and Transportation Officials (AASHTO) accreditation in applicable Concrete Technology QA test procedures (Appendix B.1).
3. A qualified QA laboratory must meet the following requirements in order to be able to perform testing on any MDOT project:
 - a. QA must, at a minimum, meet the requirements of the AASHTO R-18 document (available at AASHTO online bookstore) with regard to maintaining a laboratory Quality System Manual (QSM). The AASHTO R-18 document requirements will be applicable, at a minimum, to the test procedures listed in Appendix B.1.
 - b. The QA laboratories must employ qualified technicians (See Section 5.03.02.C.).
 - c. QA laboratories must be evaluated by MDOT Lansing CFS staff annually to ensure compliance with the requirements of the AASHTO R-18. Record of the evaluation will be kept in the QA laboratory's QSM.
 - d. QA laboratories must successfully complete a MDOT Lansing CFS laboratory conducted annual statewide proficiency or "Round Robin" program for concrete cylinder compression strength evaluation. This program will include both QA and Quality Control (QC) laboratories.
 - e. The results of the Round Robin will be compared to specific tolerance requirements of $2 \times \text{Standard Deviation}$. For QA laboratories that fail to meet the test tolerances, the testing processes and equipment must be reviewed. If an acceptable explanation can be determined, it shall be documented and included as part of the Round Robin records. If an acceptable explanation of the differences cannot be determined, the laboratory in question may be required to run additional test samples, until acceptable test results meeting proficiency tolerances are achieved.

B. Concrete QC Laboratories

1. QC laboratories must, at a minimum, meet the requirements of the AASHTO R-18 document with regard to maintaining a laboratory QSM. The AASHTO R-18 document requirements will apply to all applicable test procedures listed in Appendix B.1.
2. The QC laboratories must employ qualified technicians.

3. QC laboratories must be evaluated by an internal and/or external source¹ annually to ensure compliance of their respective QSM with the AASHTO R-18 document. The internal audit checklist provided in Appendix B.2; or internal audit check sheets available in the AASHTO R-18 document and also on the AASHTO Materials Research Laboratory website (www.amrl.net), may be used to document the laboratory evaluation. A copy of the evaluation will be included in the respective QC laboratory's QSM.
 4. QC laboratories must participate in the annual statewide proficiency or "Round Robin" concrete cylinder compression strength evaluation that will be administered by the MDOT. The results of the Round Robin will be compared to specific tolerance requirements of D2S.
- C. Concrete Qualified Technicians
1. Concrete Technology QA Technicians
 - a. Technicians performing QA testing must acquire and maintain their certification (See Appendix B.1 for types of certification required) through programs conducted or approved by the MDOT.
 - b. Technicians performing QA testing must be evaluated on a yearly basis². The Independent Assurance Testing (IAT) procedure which is located in the *MDOT Materials Quality Assurance Procedures Manual (MQAPM)* will be used for this evaluation.
 - c. A copy of each technician evaluation will be included in the QA laboratory's QSM.
 2. Concrete QC Technicians
 - a. Technicians performing QC testing must acquire and maintain their certification through a program conducted or approved by the MDOT.
 - b. Technicians must be evaluated on a yearly basis using an internal and/or external³ source.
 - c. A copy of the technician evaluation will be included in the QC laboratories' QSM. It is the responsibility of the technician to have a copy of this evaluation available at any QC laboratory in which he/she is working.

¹Internal/External Evaluation of Technicians: Technicians will be evaluated for technical proficiency in all applicable concrete test procedures from the list in Appendix A. This evaluation will either be carried out by the qualified Supervisor of the private testing Laboratory (internal evaluation) or by a recognized outside source (external evaluation) that maintains current certification in all applicable test procedures as listed in Appendix B.1.

²The IAT will be required for those years when the technician in question will be, or is anticipated to perform materials testing on projects as categorized in Section 5.03.02.01(A)

³Internal/External Evaluation of Technicians: Technicians will be evaluated for technical proficiency in all applicable concrete test procedures from the list in Appendix A. This evaluation will either be carried out by the qualified Supervisor of the private testing Lab (internal evaluation) or by a recognized outside source (external evaluation) that maintains current certification in all applicable test procedures as listed in Appendix B.1.

D. Maintaining Records

1. The MDOT will maintain a database which will include the following information for participating Concrete QA Laboratories:
 - a. Laboratory name, address, phone.
 - b. Name, phone, cell phone, email of Laboratory Supervisor or Laboratory Quality System Manager.
 - c. Round Robin date including deficiency/corrective action dates.
 - d. Copy (paper or electronic) of laboratory QSM.
2. The MDOT will maintain a database which will include the following information for QA Concrete Laboratory testing technicians:
 - a. QA technician qualification status (i.e. certification & date of expiration).
 - b. QA technician IAT dates.
3. The MDOT will maintain a database which will include the following information for participating Concrete QC Laboratories:
 - a. Laboratory name, address, phone.
 - b. Name, phone, cell phone, email of Laboratory Supervisor or Laboratory Quality System Manager.
 - c. Round Robin date including deficiency/corrective action dates.
 - d. Information regarding laboratory QSM.
4. The MDOT will maintain a database which will include the following information for QC Concrete Laboratory testing technicians:
 - a. QC technician qualification status (i.e. certification & date of expiration).
 - b. Internal/External evaluation date.

E. Disqualification of Laboratories & Technicians

1. Quality Control/Quality Assurance (QC/QA) Laboratories
 - a. It will be the responsibility of the MDOT to determine if a deficiency has occurred in a laboratory. A “deficiency” is defined as a deviation from the requirements set forth by this document.
 - b. The “deficient” laboratory will be issued a Notice of Non-Compliance; and the deficiency(s) and date of notification will be documented in the applicable databases.

- c. Failure to correct a deficiency within 20 working days of Notice of Non-Compliance will result in notification of the facility deficiency to the Engineer of CFS. The notification will originate from MDOT Laboratory Quality Systems. Engineer and will include a recommendation, up to disqualification, from testing on MDOT projects.
 - d. Upon correcting all deficiencies, a laboratory may be reinstated by the Engineer of CFS to resume testing on MDOT projects.
2. QC/QA Technicians
- a. Falsification of Test Results – Technicians found falsifying data will be disqualified from testing on all MDOT and Federal aid projects. Disqualification may be permanent as determined by the Engineer of CFS.
 - b. Failure to meet the requirements of MDOT's IAT program (QA technicians); or an internal/external review (QC technicians).
 - c. Failure to obtain recertification through a program conducted or approved by MDOT.
 - d. Upon correcting all deficiencies, a technician may be reinstated by the Engineer of CFS to resume testing on MDOT and Federal aid projects.

Appendix B.1

MINIMUM TEST PROCEDURES REQUIRED FOR MDOT QC/QA LABORATORY QUALITY PROGRAM

Procedure	ASTM/AASHTO Designation	QC/QA Technician Certification Requirement
Slump of Concrete	C 143 / T199	MCA Level I
Unit Weight of Concrete	C 138 / T121	MCA Level I
Air Content (Volumetric Method)	C 173 / T196	MCA Level I
Air Content (Pressure Method)	C 231 / T152	MCA Level I
Making and Curing Concrete Test Specimens	C 192 / T126	MCA Level I
Compressive Strengths of Cylindrical Specimens	C 39 / T22	MCA Certification OR MDOT Course
Temperature of Freshly Mixed Portland-Cement Concrete	C 1064 / T309	MCA Level I
Sampling Freshly Mixed Cement Concrete	T141	MCA Level I

Appendix B.2

MDOT Laboratories Internal Audit Checklist

Name of Laboratory	
Address	
Phone	
Fax	
Date	

1. Person responsible for managing the lab’s quality system activities.

Name	
Title	
Phone	
Email	

2.

Are all applicable reference standards up to date and available to lab staff (YES/NO)	
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3.0 Technician Qualification

3.1 List ALL Technicians that perform or are expected to perform testing on MDOT projects during the current construction year;

Add rows to the Table, if needed.

(1) Technician Name	(2) Certification Number	(3) Certification Expiration Date	(4) Test Procedure/s	(5) IAT Date for current year	(6) IAT performed by: (Name & Title)

^A: See Section 3.2 of “Concrete Laboratory and Technician Qualification Program”

3.2

Has the Laboratory trained/evaluated the competencies of ALL technicians who are performing tests on MDOT projects (per AASHTO R-18, Section 5.5). (YES/NO), if “NO” state reason/s below.	
Reason/s:	

4.3

Has the lab calibrated/standardized/checked ALL applicable testing equipment that may be used in testing on MDOT projects. (YES/NO), if " NO " state reason/s below.	
Reason/s:	

5.0 Person responsible for coordinating lab's internal audit.

Name	
Title	
Phone	
Email	
Signature	

6.0

	YES/NO
7.1 Do internal audits of the lab occur at a minimum interval of every 12 months	
7.2 Are the requirements, as set by the AASHTO R-18 Sections 5.6 & 5.7, for " Internal audits and Management Reviews " being met.	
7.3 Are the requirements, as set by the AASHTO R-18 Section 5.8, for " Corrective Action " being met.	
7.4 Are the requirements, as set by the AASHTO R-18 Sections 5.9, for " Records Retention " being met.	

QUALITY SYSTEM MANUAL REQUIREMENTS

Type "YES" if the answer is YES; leave cell empty if the answer is NO.

	Changes Made (YES/NO)	Manual Updated (YES/NO)
a) Legal Name and Address		
b) Organizational Chart/s		
c) Staff Position descriptions		
d) Staff biographical sketches		
e) Staff training methods		
f) Staff evaluation methods		
g) Staff training/evaluation forms		
h) Equipment inventory list		
i) Equipment calibration/check list		
j) Procedure describing in-house calibrations/checks		
k) In-house equipment calibration/check procedures		
l) Equipment calibration/check certificates		
m) Procedures followed to produce test records		
n) Procedures followed to prepare, check, and amend test reports		
o) Test report forms		
p) Procedures for sample identification, storage, retention, and disposal		
q) Policies relative to on-site inspections and corrective action		
r) Policies relative to proficiency sample testing and corrective action		
s) Policies relative to handling external technical complaints		
t) Policies relative to internal quality system (audit) reviews		
u) Policies relative to subcontracting		

Describe any changes and/or updates made to the Laboratory Quality Manual;

5.03.03 Aggregate

A. Definitions

1. **AASHTO R-18: “Standard Recommended Practice for Establishing and Implementing a Quality Management System (QMS) for Construction Materials Testing Laboratories”** is available for purchase and download at the American Association of State Highway and Transportation Officials (AASHTO) bookstore. This document contains criteria and guidelines for establishing and implementing a QMS for use by construction materials laboratories. The essential elements of the laboratory QMS based on the AASHTO R-18 document include, but are not limited to, setting up and implementing policies regarding equipment maintenance and calibration, technician qualification and continuing education, test results and document control and corrective action in case of nonconforming work. In addition, the AASHTO R-18 also requires participation in proficiency sample or inter-laboratory comparison testing program/s. An example of such is the Round Robin testing program. The AASHTO R-18 also requires the creation and continued updating of a Laboratory Quality System Manual (QSM). This manual will contain information and records verifying that all requirements of the AASHTO R-18 are being met at the laboratory.
2. **Department:** Michigan Department of Transportation (MDOT) Lansing Construction Field Services (CFS), MDOT Region Material Sections or Construction Staff or any other part of MDOT associated with materials testing.
3. **MDOT MQAPM:** Michigan Department of Transportation Materials Quality Assurance Procedures Manual.
4. **MDOT PQASP:** Michigan Department of Transportation Pre-Qualified Aggregate Supplier Program
5. **Internal Audit of Laboratory:** Per requirements of the AASHTO R-18 document, each participating laboratory must have a process for conducting annual internal audits of its QMS. This audit will include review of the laboratory's QSM and making sure that all requirements of the laboratory's quality systems per AASHTO R-18 document are being met and that the QSM is up-to-date. The findings of the internal audit shall be documented. The MDOT Aggregate Laboratories Internal Audit Checklists or internal audit check sheets available in the AASHTO R-18 (Appendix X1) may be used to document the laboratory internal audit. Copy of the completed document should be placed in the laboratory's QSM. The internal audit can be performed by an **internal source** or an **external source**.
6. **Internal Audit Conducted by an Internal Source** means that the laboratory internal audit is performed by the Laboratory Supervisor or whoever is in charge of laboratory's quality systems program.
7. **Internal Audit Conducted by an External Source** means that someone not employed by the laboratory performs the laboratory internal audit. Examples of internal audit of a laboratory, conducted by an external source, are Independent

Assurance Tests (IATs)⁴, on-site laboratory reviews conducted by AASHTO Materials Research Laboratory (AMRL) etc. An external source includes a source that maintains training and current certification in all applicable test procedures that are listed in Appendix C.

B. Aggregate QA Laboratory

1. QA Laboratory Qualification Process – Title 23, of the Code of Federal Regulations, Part 637, states that all States develop a procedure for qualifying all testing personnel and laboratories used in acceptance decisions for Federal aid projects on the National Highway System.
2. The MDOT Central CFS Aggregate Laboratory must maintain AASHTO accreditation in Aggregate QA test procedures that are listed below:

Test Method	Designation
Material Finer than 75 µm (No. 200) Sieve	T11 / C117
Bulk Density and Voids in Aggregate	T19 / C29
Organic Impurities in Sands	T21 / C40
Sieve Analysis of Aggregates	T27 / C136
Fine Aggregate Specific Gravity and Absorption	T84 / C128
Coarse Aggregate Specific Gravity and Absorption	T85 / C127
Abrasion of Coarse Aggregate	T96 / C131
Sand Equivalent Test	T176 / D2419
Reducing Samples of Aggregate to Test Size	T248 / C702
Moisture Content of Aggregate by Oven Drying	T255 / C566
Uncompacted Void Content of Fine Aggregate	T304 / C1252
Flat, Elongated, or Flat and Elongated Particles	---- / D4791
Fractured Particles in Coarse Aggregate	---- / D5821

3. A qualified QA laboratory must meet the following requirements in order to be able to perform testing for MDOT:
 - a. QA laboratory must meet the requirements of the MDOT MQAPM and MDOT PQASP.
 - b. QA laboratory must meet the requirements of the AASHTO R-18 document with regard to maintaining a Laboratory QMS. The QMS shall be available to the laboratory staff in the form of a QSM). The tests listed in Appendix C shall be included in the QMS.
 - c. Annual internal audits of QA laboratories (Section 5.03.03.A.(5-7)) will be conducted to ensure compliance with the MDOT MQAPM and AASHTO R-18. This audit will cover all the tests listed in Appendix C. The “MDOT Aggregate Laboratories Internal Audit Checklist” or internal audit check sheets available in the AASHTO R-18 (Appendix X1) may be used to document the internal audit. Copies of the internal audit records will be included in the respective QA laboratory’s QSM.

⁴ IATs can only be used to evaluate a technician’s proficiency in a particular test procedure and to check the accuracy of the equipment used in the IAT. Therefore, IATs are not substitute for a complete internal audit of all elements of a laboratory’s QMS.

- d. QA laboratories must employ qualified technicians (See Section 5.03.03.D.).
- e. MDOT Lansing CFS staff will biennially evaluate QA laboratories to ensure compliance with the requirements of the MDOT MQAPM and AASHTO R-18. Record of the evaluation will be kept in the QA laboratory's QSM.
- f. QA laboratories must participate in the annual proficiency testing programs administered by AMRL for coarse aggregate and fine aggregate. The following provide the inputs that shall be submitted to AMRL for each proficiency test.

Fine Aggregate Proficiency Test Inputs
Material Finer Than 75- μ m (No. 200) Sieve Total Oven Dry Mass of Specimen Before Washing (0.1 g) – T11/C117
Material Finer Than 75- μ m (No. 200) Sieve Percentage Finer Than 75-μm sieve by washing (0.01 g) – T11/C117
Sieve Analysis of Aggregates Total Material Passing the 4.75-mm (No. 4) Sieve (0.1 percent) – T27/C136
Sieve Analysis of Aggregates Total Material Passing the 2.36-mm (No. 8) Sieve (0.1 percent) – T27/C136
Sieve Analysis of Aggregates Total Material Passing the 1.18-mm (No. 16) Sieve (0.1 percent) – T27/C136
Sieve Analysis of Aggregates Total Material Passing the 600-μm (No. 30) Sieve (0.1 percent) – T27/C136
Sieve Analysis of Aggregates Total Material Passing the 300-μm (No. 50) Sieve (0.1 percent) – T27/C136
Sieve Analysis of Aggregates Total Material Passing the 150-μm (No. 100) Sieve (0.1 percent) – T27/C136

Coarse Aggregate Proficiency Test Inputs
Material Finer Than 75- μ m (No. 200) Sieve Percentage Finer Than 75-μm sieve by washing (0.1 g) – T11/C117
Sieve Analysis of Aggregates Total Material Passing the 25.0-mm (1-in.) Sieve (0.1 percent) – T27/C136
Sieve Analysis of Aggregates Total Material Passing the 19.0-mm (3/4-in.) Sieve (0.1 percent) – T27/C136
Sieve Analysis of Aggregates Total Material Passing the 12.5-mm (1/2-in.) Sieve (0.1 percent) – T27/C136
Sieve Analysis of Aggregates Total Material Passing the 9.5-mm (3/8-in.) Sieve (0.1 percent) – T27/C136
Sieve Analysis of Aggregates Total Material Passing the 4.75-mm (No. 4) Sieve (0.1 percent) – T27/C136

1. The results from proficiency testing will be compared to 2 \times Standard Deviation tolerance requirements. QA laboratories that fail to meet test tolerances will conduct a review of the testing processes and equipment. A copy of the results of this review will be documented and included in the QSM. If an acceptable explanation of the differences cannot be determined, the

laboratory in question may be required to run additional test samples, until acceptable test results meeting proficiency tolerances are achieved.

C. Aggregate Quality Control (QC) Laboratories

1. The “MDOT Aggregate Laboratory and Technician Qualification Program” applies only to QC laboratories that are also “MDOT PQASP” approved.
2. MDOT PQASP QC laboratories must follow the program in the MDOT MQAPM “**General Materials Certification Procedures for Approved Manufacturers/Supplier Status**”. The Pre-Qualified Aggregate Supplier QC laboratories must identify which of the test procedures listed in Appendix C will be part of their QC processes.
3. MDOT PQASP QC laboratories must follow the AASHTO R-18 document with regard to developing and maintaining a Laboratory QMS. The QMS shall be available to the laboratory staff in the form of a QSM. The MDOT PQASP QC laboratories must identify which of the test procedures listed in Appendix C will be part of their QMS. The AASHTO R-18 document requires that the laboratory QMS shall, at a minimum, contain the following information:
 - a. **Management Requirements (Section 5 and Appendix X1 of AASHTO R-18):** QMS, Document Control, Organization, Staff, Technician Training and Evaluation, Internal Audits, Corrective Action, Records Retention.
 - b. **Technical Requirements (Section 6 and Appendix B1 of AASHTO R-18):** Equipment Calibration, Standardization, Checks and Maintenance, Measurement Standards, Sample Management, Test Records and Reports, Subcontracting, Assuring the Quality of Results.
4. The MDOT PQASP QC laboratories must employ qualified technicians (See Section 5.03.03.D.).
5. Either an internal or external source will conduct the annual internal laboratory audit (see section 5.03.03.A.(5-7)) of the QC laboratory to ensure compliance with the MDOT MQAPM and AASHTO R-18 guidelines. This audit will cover all the tests mentioned in the laboratory’s QSM and MDOT MQAPM QC Plan. The “MDOT Aggregate Laboratories Internal Audit Checklist” or internal audit check sheets available in the AASHTO R-18 (Appendix X1), may be used to document the laboratory evaluation. A copy of the evaluation will be included in the respective QC laboratory’s QSM.
6. QC laboratories are not required to participate in AASHTO Materials Research Laboratory proficiency testing program.

D. Aggregate Qualified Technicians

1. Aggregate QA Technicians:

- a. Technicians performing QA testing must acquire and maintain an appropriate level of qualification through the Michigan Certified Aggregate Technician Certification Program.
- b. Technicians performing QA testing must be evaluated according to the procedures set forth in the MDOT MQAPM
- c. Include a copy of each technician's evaluation (i.e. IAT⁵) in the QA laboratory's QSM. Furthermore, electronic copies of completed IAT forms must be uploaded onto ProjectWise (Statewide Groups/IAT/Aggregate/*current year*).

2. Aggregate QC Technicians:

- a. Technicians performing QC testing at MDOT PQASP laboratories must acquire and maintain an appropriate level of qualification through the Michigan Certified Aggregate Technician Certification Program.
- b. Include a copy of each technician's record of annual evaluation⁶ in the QC Laboratory's QSM. If the technician is working at more than one laboratory, copy of the record will be available at each location where he/she is working.

E. Maintaining Records

1. The MDOT will maintain a database that will include the following information for participating Aggregate QA laboratories:

- a. Laboratory name, address, phone.
- b. Contact information of Laboratory Supervisor and/or Laboratory Quality System Manager.
- c. Participation in proficiency testing program/s which shall include any corrective action records.
- d. CFS laboratory reviews.
- e. Quality Control/Quality Assurance (QC/QA) laboratories Internal Audit Checklists which are to be submitted annually by the laboratories specified in the requesting memorandum.

⁵. Refer to the MDOT MQAPM for information on IATs.

⁶. Annual Evaluation of lab technicians is completed as part of a lab's annual internal audit (Section 5.03.03.01 E-G). Additional technician evaluations may be carried out on an as-needed basis.

2. The MDOT will maintain a database that will include the following information for QA Aggregate laboratory testing technicians:
 - a. QA technician qualification status (i.e. certification & date of expiration).
 - b. QA technician's IAT dates.
 3. The MDOT will maintain a database that will include the following information for participating MDOT PQASP QC laboratories:
 - a. Laboratory name, address, phone.
 - b. Contact information of Laboratory Supervisor and/or Laboratory Quality System Manager.
 4. The MDOT will maintain a database that will include the following information for QC Aggregate laboratory testing technicians:
 - a. QC technician qualification status (i.e. certification & date of expiration).
- F. Disqualification of Laboratories and Technicians
1. QC/QA Laboratories:
 - a. It will be the responsibility of the Department to act once a deficiency has occurred in a laboratory. A "deficiency" is defined as a deviation from the requirements set forth by this document, the MDOT PQASP in the MDOT MQAPM and the AASHTO R-18 document.
 - b. The "deficient" laboratory will be issued a Notice of Non-Compliance by MDOT Lansing CFS.
 - c. Failure to correct a deficiency(s) within 20 working days of Notice of Non-Compliance will result in notification of the facility deficiency to the Engineer of CFS. The notification will originate from the MDOT Laboratory Quality Systems (LQS) Engineer and will include a recommendation, up to and including disqualification, from testing on MDOT and Federal aid projects.
 - d. If a laboratory is disqualified, that laboratory may apply for reinstatement after correcting the deficiency(s). The Engineer of CFS will review the application to resume testing on MDOT and federal aid projects.
 2. QC/QA Technicians:
 - a. Technician Deficiencies:
 1. Falsification of Test Results – Technicians found falsifying test reports will be disqualified from testing on all MDOT and Federal aid projects. Disqualification may be permanent as determined by the Engineer of CFS.

2. Failure to meet the requirements of MDOT IAT program.
 3. Failure to acquire and/or maintain certification through a program conducted or approved by MDOT.
- b. Failure to pass proficiency sample test program.
 - c. It will be the responsibility of the Department to determine if a deficiency involving a technician has occurred.
 - d. The “deficient” technician will be issued a Notice of Non-Compliance; and the deficiency(s) and date of notification will be documented in the applicable databases.
 - e. Failure to correct a deficiency within 20 working days of Notice of Non-Compliance will result in notification of the technician deficiency to the Engineer of CFS. The notification will originate from the MDOT LQS Engineer and will include a recommendation, up to disqualification, from testing on MDOT and Federal aid projects.
 - f. If a technician is disqualified, they may apply for reinstatement after correcting the deficiency(s). The Engineer of CFS and Controlling Region Materials Supervisor will review the application to resume testing on MDOT and Federal aid projects.

Appendix C

MINIMUM TEST METHODS REQUIRED FOR QC/QA⁷ LABORATORIES

Procedure	MTM/AASHTO/ASTM Designation
Sampling Aggregates	MTM 107
Sampling Open Graded Drainage Course Compacted in Place	MTM 119
Reducing Samples of Aggregates to Testing Size	T248/C702
Percent Finer than 75- μ m by Washing	MTM 108
Sieve Analysis	MTM 109
Determining Deleterious Particles in Aggregate	MTM 110
Determining Percentage of Crushed Particles in Aggregate	MTM 117
Organic Impurities in Fine Aggregate for Concrete	T21/C40
Flat, Elongated, or Flat and Elongated Particles in Coarse Aggregate	ASTM 4791

⁷ Depending on the type of aggregate/s supplied to MDOT; not all tests listed above would necessarily be applicable to any particular Quality Control laboratory.

5.03.04 Field Density Testing

A. Field Density Technician Qualifications

1. Technicians performing field density testing must be certified and evaluated as necessary by Independent Assurance Test (IAT) in accordance with the following criteria:
 - a. Certification
 1. Technicians performing Quality Assurance testing on departmental projects must become certified and maintain certification through a program conducted or approved by the MDOT Geotechnical Services Section, Density Technology Unit.
 - b. Independent Assurance Tests (IAT)
 1. NHS routes
 - a. Technicians who perform density testing on federal aid projects on the National Highway System (NHS) must be evaluated by an IAT. IAT procedures outlined in the MDOT Quality Assurance Procedures Manual will be used for this evaluation.
 2. Non NHS routes
 - a. Evaluation by IAT is not required; however, MDOT reserves the right to evaluate technician proficiency using IAT procedures outlined in the MDOT Quality Assurance Procedures Manual.

B. Maintaining Records

1. Lansing C&T Geotechnical Services Section maintains a data base which includes the following information for Field Density Testing Technicians:
 - a. Radiation safety training data
 - b. Density certification training dates
 - c. Certification number
 - d. Expiration date
 - e. Technician name and address*

* The technician is responsible for informing the department of address change.

2. The database is updated periodically as training sessions are conducted

C. Disqualification of Technicians

1. Falsifying Data

- a. Technicians found falsifying data will be disqualified from acceptance testing on MDOT and federal aid projects. The term of disqualification may be permanent and will be determined by the Engineer of C&T.

2. Failure to obtain Recertification

- a. Technicians who allow their certification to lapse are not qualified to perform density testing on MDOT or federal aid projects. Reinstatement will be considered only after successful completion of a training program conducted or approved by the MDOT Geotechnical Services Section, Density Technology Unit. The specific coursework necessary for reinstatement will be determined by the Engineer of C&T.

3. Failure to meet the requirements of the IAT program

a. NHS routes

1. Technicians who fail to meet the requirements of the IAT program as outlined in the MDOT Quality Assurance Procedures Manual will be disqualified from acceptance testing on NHS routes.

b. Non NHS routes

1. MDOT reserves the right to evaluate and disqualify technicians from density testing using IAT procedures outlined in the MDOT Quality Assurance Procedures Manual. If evaluation is deemed necessary, technicians failing to meet these requirements may be disqualified from density testing.

4. Other actions deemed detrimental to the MDOT Quality Assurance Program