

March 2014

This manual is under revision with an expected publication date of October 1, 2014.

The program title was changed July 27, 2007 to Technician Certification Program.

Class titles and certification pre-requisites requirements have changed in some instances.

For any questions about current requirements, please contact Sharon Taylor at 701-382-6937 or email at staylor@nd.gov



**North Dakota Department of Transportation
Transportation Technician Qualification Program
Pavement Inspector Qualification and
Qualifying Laboratory Program**

Materials and Research Division

April 1, 2002

About this Manual

The North Dakota Department of Transportation, (NDDOT) Materials and Research Division has developed this manual to provide the basic design and operation of the North Dakota Transportation Technician Qualification Program (NDTTQP). This manual also covers the Inspector Qualification and the Qualified Laboratory Programs.

All State DOT's require technician qualification. While many qualification programs vary in structure, they all establish a minimum level of sampling and testing ability.

North Dakota Department of Transportation Mission/Vision Statement

Providing a transportation system that safely moves people and goods.

Notice to All Applicants

Testing results, qualification, de-qualification, suspensions, revocations, and all other records compiled pursuant to this program are public records. NDDOT does not guarantee the confidentiality of any records or proceedings, and will release all information as required by law.

Persons with disabilities and those who have special needs should notify the NDTTQP representative at the time of registration so that appropriate accommodations can be made.

Contacts

If you have any questions regarding the programs or certification policies, please contact:

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District Materials Coordinators - this list replaces information currently found on Page 17.

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3/2014 - This page was updated and differs from the original program manual. Changes were made to provide current contact information.

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Background

In 1994, the North Dakota Department of Transportation established a quality control and quality assurance (QC/QA) program for Hot Bituminous Pavement (HBP) construction. This program established a series of training courses and exams that tested individual's knowledge and ability to sample and test materials, including aggregates, on HBP projects. The program also included training for asphalt pavement inspection.

In June 2000, the NDDOT implemented a program offering qualifications in the areas of concrete and soil testing. The combined sampling and testing technician qualification programs for aggregates, concrete, soils and asphalt is now called, The North Dakota Transportation Technician Qualification Program (NDTTQP).

Additionally, in June 2000, NDDOT implemented a program to assure that the laboratories and equipment used in laboratories met a minimum quality level. This was accomplished by establishing documented calibration procedures and recording forms for the equipment that is used for sampling and testing. The goal of the program is to ensure equipment used is uniform and will provide consistent results.

The objective of the NDTTQP is to assure that sampling and testing of materials is being performed by individuals who are competent in the area that they are sampling and testing. This is done by having the technicians demonstrate their ability to perform the sampling and testing procedures correctly in both a written and proficiency exam setting.

All laboratories and technicians involved in the sampling and testing of materials on Federal-Aid highway projects on the National Highway System (NHS) must be qualified through NDDOT qualification program.

Technician Qualification Program

Definition of Technician Qualification (Qualified)

NDDOT defines the term **Qualification** as the final outcome of an individual who has favorably met the requirements as defined in this document. These are only requirements defined by NDDOT and affirms that the recipient has demonstrated a minimum level of knowledge and ability, and is authorized to perform sampling and testing on transportation projects under the authority of the NDDOT.

Who Must Be Qualified

All persons responsible for sampling, testing and reporting on tests in any of the technical areas in which qualifications are offered on any NHS project under the authority of the NDDOT must be qualified. Qualification may be granted only after successfully completing the requirements of this program. "Grandfathering" or "exceptions" to the NDTTQP are not allowed.

Disclaimer

Qualification of an individual by the NDTTQP indicates only that the individual has demonstrated a certain level of ability on a written and proficiency examination in a selected field of materials. The NDDOT and FHWA specifically disclaims any responsibility for the actions, or the failure to act, of individuals who have been qualified through the NDTTQP.

Administration

The Materials and Research Division of the North Dakota Department of Transportation is responsible for the administration of NDTTQP. A database containing qualification records is maintained by the Materials and Research Division.

The Geotechnical and Research Engineer is identified as the Program Director. The Program Director is responsible to coordinate the activities of the program; scheduling of instructional courses and classroom examinations, preparing and distributing instructional materials, arranging for instructors, providing the necessary facilities, arranging for proficiency testing and grading examinations.

Review Board

A Review Board shall be assembled and convened when necessary. This Board shall be comprised of five members. The members will be selected from the following offices or agencies: Materials and Research, Construction, District, Maintenance and Engineering, FHWA, Association of General Contractors (AGC), or a consulting engineering firm. The Board shall be responsible for all disciplinary actions.

Reciprocity

NDDOT will provide background information on qualifications held in North Dakota to individuals wishing to obtain qualification from another state. General information can be obtained by writing or calling the NDDOT Materials and Research Division.

Requests for acceptance of qualifications obtained from another state or organization may be submitted for acceptance. An Application for Acceptance of Certification form must be completed and submitted to the Program Manager for consideration. Reciprocal qualification is done on a case by case basis.

American Concrete Institute (ACI), Concrete Field Testing Technician Level 1 qualification will be accepted for Concrete Field Level II.

Revocation or Suspension of Qualification

All qualifications remain the property of NDDOT. In cases requiring evaluation for revocation or suspension, the Review Board will review all cases and perform necessary action.

NDDOT reserves the right to re-evaluate qualification status at any time and make recommendations to the Review Board, for just cause. Just cause includes, among others, when the Review Board is convinced that an individual knowingly committed acts which are detrimental to the integrity of the NDTTQP and/or the construction industry in general.

The Review Board may impose suspension or revocation of an individual's qualification at any time. The reasons that an individual will be subject to revocation or suspension of their qualification are falsification of records/tests/reports, negligence, or abuse of their responsibilities. The Review Board may also suspend or revoke an individual's qualification for other reasons of just cause, which may or may not be specifically defined.

Negligence is defined as repeated deviations from approved procedures, which may or may not cause erroneous results. A reoccurring finding of negligence will result in a

letter from the Review Board to the Employer directing them to write a letter of reprimand to the individual. A continuing finding will result in a thirty (30) day suspension of the individual's qualification. Any subsequent finding will be treated as abuse.

Abuse is defined as intentional deviations from approved procedures. The first instance of abuse shall result in a one (1) year suspension of an individual's qualification. Any subsequent finding of abuse shall result in the permanent revocation of the individual's qualification.

Falsification of records/tests/reports: Any person, who knowingly makes any false statements of records/tests/reports as to the quantity, quality, or cost of the material used on, or the work performed on any federal-aid project is also subject to be fined or imprisoned in accordance with Title 18, United States Code Section 1020. If convicted of such a crime, all qualifications will be revoked for a minimum of 5 years.

Further examples of situations which could result in suspension or revocation of qualification privileges include, but are not limited to the following:

- Falsification of field or quality control test results and/or records.
- Cheating on qualification exams.
- Submittal of false information on qualification applications.
- Submittal of trial mix calculations which have not been performed by the individual whose signature is affixed.
- Submittal of trial mix results that are not obtained by running the complete series of mix design tests and calculations.
- Knowingly performing trial mix calculations for another individual who is submitting them for qualification purposes.
- Termination of an individual due to job incompetence.
- Criminal action by an individual while engaged in construction activities.

If NDDOT begins proceedings to suspend or revoke an individual's qualification, the individual will receive written notification. A copy of the revocation notification and supporting documents will be forwarded to the Review Board. The individual will be allowed 60 days from the date of the notification letter to respond by letter of explanation to the Review Board. During this time, the individual's qualification is considered probationary. The individual may perform testing or manage test records that require a qualified individual to complete, but must indicate on each test record involved that qualification is probationary.

If a letter of explanation is not received, it will be assumed by the Review Board that the individual does not protest the allegations set forth in the notice and the case will be reviewed by the Review Board to the best extent possible without benefit of explanation. The Review Board will determine any length of suspension or revocation period and notify the individual. Any findings of abuse or negligence warranting the revocation or

suspension of an individual's qualification will result in the revocation or suspension of all qualifications held by that individual in the various qualification areas.

A qualification under probation returns to good standing if the Review Board determines the allegations are unsubstantiated or without merit.

If the individual wishes to become re-qualified after a period of suspension or revocation has expired, the individual will be required to retake all subsequent tests, without the benefit of reciprocity.

Written Examinations

As part of the qualification process, a written exam must be completed. It is encouraged that the individual attend formal training or participate in a self study program before testing. All exams are open book. A minimum overall score of 70% is required to successfully pass a written exam.

Re-tests may be requested if an individual receives a grade of 60 to 69% on the exam.

If the individual receives a score less than 60%, they must wait 30 days after notification before re-testing. This individual must also review all available study materials before re-testing will be allowed.

Written exams for Level II must be completed within one year of performance exams. The qualification expiration date will be calculated from the completion date of the earliest exam.

Individuals qualified as Level III Examiners give Level I or Level II written exams.

Checklists and exams for Level I procedures are retained by the District as verification of the successful demonstration of the test procedure. The results of all proficiency examinations, as well as the written examinations, must be provided to the Program Manager within two weeks of the exam.

Proficiency Examinations

The second part of the qualification process is a proficiency examination. This examination may be completed with the procedure open for reference. Referral to the Examiner's checklist during the exam is not permitted. The individual is required to accurately perform all steps of the test procedures.

Proficiency examinations may be performed at any location where calibrated sampling and testing equipment is available and materials to test is available.

Scoring of the exam is on a pass/fail basis. Scoring is based on the ability to correctly perform all steps of each procedure for each of the methods based on criteria shown on the proficiency examination checklist. Omission of one or more of the prescribed steps constitutes a failure. The inability to complete the test method within the designated time limit also constitutes failure.

One repeat trial of a failed procedure is allowed, at the Examiner's convenience, on the day of the original exam. The examinee may request that a different Examiner administer a repeat trial. A second failure of any one of the prescribed test methods constitutes failure of the proficiency examination portion of the Qualification process.

The proficiency Examiner is present throughout the examination. The Examiner may not respond to questions or assist in the completion of the procedure. If a failure has occurred, the Examiner will denote which part of the method was performed or described incorrectly. The Examiner will not stop a trial when an error has occurred, nor will they in any way signify approval or disapproval. Any disputes will be referred immediately to the Program Director.

If the proficiency exam portion is failed, retesting will not be allowed for 30 days. The individual must review the test procedures before attempting to repeat the proficiency exam.

Individuals qualified as Level III Examiners conduct the proficiency exams.

Individuals conducting the exams to achieve Level III are personnel from NDDOT Central Laboratory who are involved in the AASHTO Laboratory Accreditation Program.

Checklists and exams for Level I procedures are retained by the District as verification of the successful demonstration of the test procedure. The results of all proficiency examinations, as well as the written examinations, must be provided to the Program Manager within two weeks of the exam.

Technician Qualifications

Qualifications are divided into three different levels (I, II, and III). These level are independently applicable for the different material categories listed below.

Level I

Level I qualification is intended for temporary, seasonal, or permanent personnel who are performing limited sampling and testing. This level allows qualification on an individual test basis on the test procedures listed below.

Applicants will be provided with a copy of the test procedure(s) and must become familiar with them. All applicable study materials should be reviewed.

This level of qualification requires completion of a written examination and proficiency exam for each individual test. It is recommended that technicians complete a minimum of one week of supervised on-the-job training or until proficiency is obtained prior to the proficiency test. During this time of on-the-job training, the individual will not sample or test without the direct supervision of a level II or level III technician.

Level I qualifications are valid through the end of the calendar year completed.

Level I Test Procedures

Sampling Aggregate T 2
Sample Reduction T 248
Sieve Analysis of Coarse and Fine Aggregate T 27 & T 11
Shale, Hard Iron Oxide Particles, Lignite and other Coal, Soft Particles,
Thin and Elongated NDDOT
Liquid Limit T 89
Plastic Limit T 90
Total Moisture Content of Aggregate T 255
Fractured Particles in Coarse Aggregate NDDOT
Sampling & Splitting Field Verification HBP Samples, NDDOT
Specific Gravity Fine T 84
Specific Gravity Coarse T 85
Lightweight Pieces in Aggregate T 113
Flat or Elongated Particles in Coarse Aggregate D 4791
Fine Aggregate Angularity T 304 Method A
Sand Equivalent of Fine Aggregate AASHTO T 176
Marshall Mix Compaction and Sample Extrusion T 245

Sampling Concrete T 141
Casting Test Specimens T 23
Slump T 119
Flexural Strength of Concrete T 97
Air Content of Freshly Mixed Concrete T 152
Unit Weight, Yield T 121
Capping Cylindrical Concrete T 231
Compressive Strength of Cylinders T 22

Dry Preparation of Soil T 87
Moisture Density Relation of Soils T 99/T 180
Moisture Content of Soils T 265
Speedy Moisture T 217
Soil Density D 2167

Level II

Level II qualification is intended for experienced temporary or permanent individuals whose primary job responsibility is sampling and testing. This level of qualification allows individuals to perform all sampling and testing associated in the particular material category. The qualification areas are listed below.

A prerequisite to this level of qualification is successful completion of the requirements for qualification as a level I, in all applicable tests procedures associated with the material category. An additional requirement is successful completion of a Level II written exam. The exam covers the subject and requires a more in-depth knowledge of the subject area.

Individuals who are experienced in sampling and testing and wish to obtain Level II, may request to write the Level II exam before completing any or all the Level I proficiency and written exams. If the Level II written exam is passed, the associated proficiency exams must be performed to complete the qualification process.

Level II qualification is valid for five years. After five years, the written and proficiency exams must be repeated. Continued qualification as a level II maintains qualification in all prerequisite qualifications.

Level II Qualification Areas

Aggregate Lab

Sampling Aggregate T 2
Sieve Analysis of Fine and Coarse Aggregate T 27 & T 11
Specific Gravity Fine T 84
Specific Gravity Coarse T 85
Liquid Limit T 89
Plastic Limit T 90
Sample Reduction T 248
Total Moisture Content of Aggregate T 255
Shale, Hard Iron Oxide NDDOT
Lightweight Pieces in Aggregate T 113

Aggregate Field

Sampling Aggregate T 2
Sieve Analysis of Fine and Coarse Aggregate T 27 & T 11
Sample Reduction T 248
Total Moisture Content of Aggregate T 255

Bituminous Mix Lab

Specific Gravity Fine T 84
Specific Gravity Coarse T 85
Lightweight Pieces in Aggregate T 113
Fine Aggregate Angularity T 304 Method A
Flat or Elongated Particles in Coarse Aggregate D 4791
Fractured Particles in Coarse Aggregate NDDOT
Stability & Flow T 245
Bulk Specific Gravity T 166
Marshall Mix Compaction T 245
Theoretical Maximum Specific Gravity T 209
Gyratory Compactor TP 4
Sand Equivalent T 176
Sampling & Splitting Field Verification HBP Samples (NDDOT)

Bituminous Mix Field

Sand Equivalent T 176
Sampling & Splitting Field Verification HBP Samples (NDDOT)
Bulk Specific Gravity T 166
Marshall Mix Compaction T 245
Theoretical Maximum Specific Gravity T 209
Gyratory Compactor TP 4

Concrete Field

Casting Test Specimens T 23
Slump T 119
Sampling Concrete T 141
Air Content of Freshly Mixed Concrete T 152
Flexural Strength of Concrete T 97
Unit Weight, Yield T 121

Concrete Lab

Flexural Strength of Concrete T 97
Capping Cylindrical Concrete T 231
Compressive Strength of Cylinders T 22

Smoothness

Profilograph ASTM E 1274
Pavetech Van, ASTM E 950

Soils

Dry Preparation of Soil T 87
Moisture Content of Soils T 265
Liquid Limit T 89
Plastic Limit T 90
Moisture Density Relation of Soils T 99/T 180
Speedy Moisture T 217
Soil Density D 2167

Level III - Examiner

This level is limited to approved NDDOT employees who have a minimum of 5 years experience with highway construction related materials. Individuals at this level administer the performance and written exams for Level I and Level II. This level of qualification allows individuals to administer examinations and perform all sampling and testing associated in the particular material category of qualification as presented below in Level III Qualification Areas.

A prerequisite is Level II qualification in all applicable material categories. The individual also needs to demonstrate further knowledge and ability through a written and proficiency exam under the direct supervision of the NDDOT Central Laboratory employees who are involved in the AASHTO Laboratory Accreditation Program.

Level III qualification is valid for five years. After five years, the proficiency and written exams must be repeated at the Central Laboratory. Continued qualification as a level III maintains qualification in all prerequisite qualifications.

Level III Qualification Areas

Aggregates

Aggregate Field

Aggregate Lab

Asphalt

Bituminous Mix Field

Bituminous Mix Lab

Concrete

Aggregates Lab

Concrete Field

Concrete Lab

Soils

Soils

Inspector Qualifications

Bituminous Pavement Inspector

Bituminous Pavement Inspectors are required for basic inspection. They work under supervision of a Bituminous Mix Controller. Requirements are successful completion of Introduction to Asphalt and Street Inspection and Compaction.

Bituminous Mix Controller

Bituminous Mix Controllers work more independently and are in roles of decision making and supervisory. Completion of Introduction to Asphalt, Bituminous Quality Assurance Testing, Street Inspection and Compaction and Bituminous Process Field Verification are required.

Training - Classes and Material

Classes

Introduction to Asphalt

This is an introductory course that covers asphalt materials and aggregates. It is taught entirely in a classroom. A written examination is offered at the completion of the course.

Bituminous Quality Assurance Testing

This course is for those who will work in the quality control and quality assurance testing area of a bituminous hot-mix plant. It is taught in the classroom and a laboratory. It covers testing procedures specified in the NDDOT QC/QA specifications. These procedures include tests required for the bituminous proficiency test for a Bituminous Mix Field or Bituminous Mix Lab. Some of the tests are maximum specific gravity (Rice test), percent air voids as determined from Marshall specimens, gyratory specimens and percent air voids determined from compacted pavement cores for the specified density method. A written examination is offered at the completion of the course.

Bituminous Street Inspection and Compaction

This is a paving and compaction course for the street paving inspector and the contractor's superintendent and foreman. It is taught entirely in the classroom and covers subjects such as paver and roller types and operations, specification requirements, and agency and industry roles and responsibilities. A written examination is offered at the completion of the course.

Bituminous Process Field Verification

This course is for Bituminous Mix Controllers, Plant Superintendents, Agency Project Managers and Engineers, and both Agency and Testing Lab Supervisors. It is taught entirely in the classroom and it covers bituminous Mixture Design requirements and working ranges as specified by NDDOT QC/QA specifications. It also covers subjects such as blending aggregates, recycled mixture design, detection of data uniformity, warranted adjustments and the philosophy of responsive product system compliance. A written examination is offered at the completion of the course.

Bituminous SuperPave

This course covers aspects of SuperPave. Subjects discussed are laboratory procedures necessary to interpret, conduct gyratory mix design/analysis, PG binder selection, aggregate blends, aggregate consensus properties, mix volumetrics and gyratory compactor electronics with accompanying calibration procedures. A written examination is offered at the completion of the course.

Bituminous Re-Qualification

This is a one day refresher course that highlights topics from all bituminous classes. A written exam is offered at the completion of the course.

Training Material

Soils Manual, Fifth Edition, The Asphalt Institute

Design and Control of Concrete Mixtures, Portland Cement Association

NDDOT Field Sampling and Testing Manual

Videos

Liquid Limit T 89

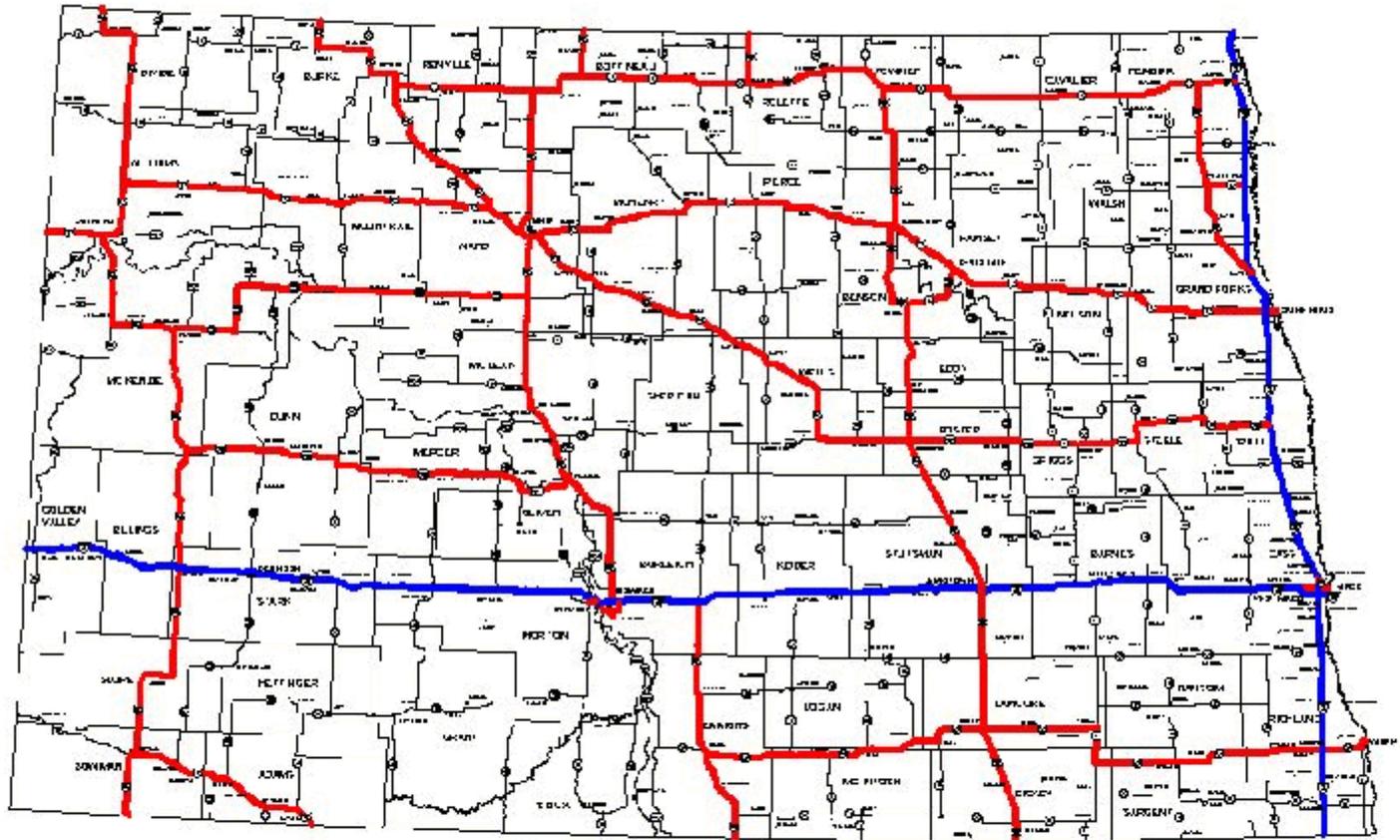
Plastic Limit T 90

Fractured Faces, NDDOT

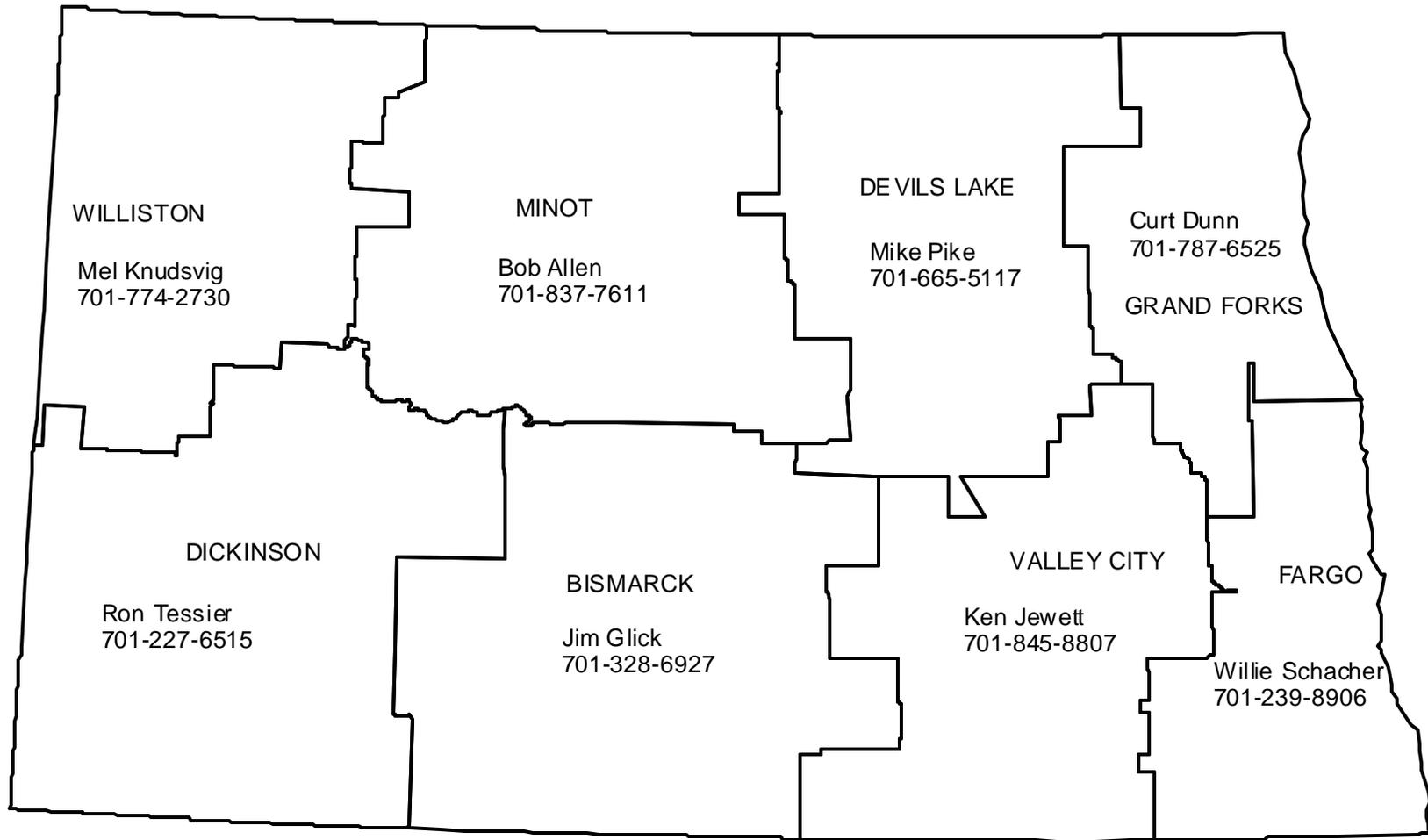
Gradation T 27

Rice Method (Theoretical Maximum Specific Gravity) T 209

Contact the Materials and Research division for availability of additional training videos.



Highways on the National Highway System (NHS)



DOT District Materials Coordinators

Qualified Laboratory Program

The following is a summary of the Qualified Laboratory Program.

The qualified laboratory program primarily consists of assuring the calibration and maintenance of sampling and testing equipment. This is accomplished by assuring that all testing equipment is calibrated and recorded. The Independent Assurance (IA) testing program is used to monitor uniformity of the testing equipment and test procedures. Each entity is responsible for maintenance and repair of their testing equipment.

Requirements

All laboratories must be well-maintained and clean to ensure proper operation of sampling and testing equipment. It is the responsibility of the laboratory owner to assure that all equipment has been calibrated and documented according to these procedures to perform sampling and testing for NDDOT. Exception to these procedures will be addressed on a case-by-case bases and should be brought to the attention of the NDDOT Central Laboratory Manager in writing.

All equipment shall be calibrated at the frequency shown in the Equipment Calibration and Verification Lists found at the end of this section.

The equipment shall be calibrated according to the Verification/Calibration Procedures. The calibration results are recorded on the Equipment Calibration Records forms.

Equipment Calibration Records shall be retained in the laboratory where the equipment is located for a period of three years.

Equipment not meeting requirements shall not be used for sampling and testing and it is recommended that the equipment be destroyed and disposed of.

Laboratory Responsibilities

The following is a list of responsibilities and activities that the different laboratories are required to perform:

- NDDOT Central Materials Laboratory
 - Define equipment calibration frequencies, procedures, and recording method.

- District Materials Laboratories
 - Calibrate district laboratory and field laboratory equipment.
 - Maintain equipment inventory and calibration records at the location of the equipment.
 - Maintain equipment calibration records.
 - Assure contractor, consultant, or others' laboratory equipment is calibrated according to NDDOT procedures.
 - Review contractor, consultant, or others' records.

- Contractor, Consultant, or Others' Laboratories
 - Calibrate their test equipment prior to use on project.
 - Maintain equipment inventory and calibration records at the location of the equipment.
 - Cooperate in the inspection of their equipment and records.