SECTION 100.00 LABORATORY OPERATIONS

The Idaho Transportation Department (ITD), with approval from Federal Highway Administration (FHWA), is responsible for verifying that laboratory operations are performed in accordance with federal and state regulations for the testing of materials incorporated into highway construction projects.

In the event there appears to be a conflict between statements contained in the Laboratory Operations Manual and the current Idaho Standard Specifications for Highway Construction, the Standard Specifications will prevail.

SECTION 110.00 LABORATORY FACILITIES

The ITD Standard Specifications require every laboratory to be qualified according to the ITD Laboratory Qualification Program (see Section 200.00) to perform testing for a Department project. The Federal Code (23CFR 637B) requires the HQ Central Laboratory to be accredited by the American Association of State Highway and Transportation Officials (AASHTO).

110.01 Testing Performed by a Department Laboratory for Government Agencies. Laboratory testing, field testing, or inspection service is occasionally performed for another government agency. A government agency is defined as a federal, county, city, school district, or state agency.

Testing fees are sometimes waived; however, the Department will determine on an individual basis whether testing fees will be collected.

110.02 Testing and Inspection Performed by Department Personnel for the Public. The Department testing facilities are not public service laboratories. The Department cannot perform any testing or inspection services for the general public or for a commercial firm or contractor unless the material is related to a highway project or research project.

110.03 ITD Laboratory Facilities. The ITD Laboratory Facilities consist of HQ Central Laboratory and the District Laboratories.

110.03.01 HQ Central Laboratory. The purpose of the Central Laboratory is to provide testing and technical support to the ITD Division of Highways. This is accomplished through materials research and testing of products and specialized testing of construction materials for highway projects that cannot be performed in the district laboratory facilities. The Central Laboratory also performs dispute resolution testing. Each laboratory unit of the Central Laboratory is AASHTO accredited.

The mailing address for the Central Laboratory is:

Central Laboratory
Idaho Transportation Department
3293 Jordan Street
Boise ID 83702-2151

See Section 300.00 for further description of each laboratory's function and details of the tests performed.

110.03.02 ITD District Laboratories and Field Test Facilities. Testing laboratories are located in each of the Department's districts, namely:

- District 1 – Coeur d'Alene
- District 2 – Lewiston
- District 3 – Boise
- District 4 – Shoshone
- District 5 – Pocatello
- District 6 – Rigby

These district laboratories may perform:

- Acceptance laboratory tests
- Verification Tests
- Preliminary investigation tests
- Independent Assurance (IA) tests
- Test Strip (When Qualified)

Contractual requirements will specify the test methods to be performed by Department laboratories.

Each district uses portable field test trailers where onsite project acceptance and verification field tests are performed for materials (e.g., aggregate, asphalt, and concrete).

110.04 Qualified Laboratories. ITD Standard Specifications require the use of a qualified laboratory when the contractor is responsible for the sampling and testing of project materials. The non-ITD-Qualified laboratories may be permanent facilities, a trailer, or a building temporarily located at a project site.

110.05 Qualification of Test Laboratories. All test facilities must be qualified through the ITD Laboratory Qualification Program to test materials for Department projects. See Section 200.00.

SECTION 120.00 MATERIALS SAMPLES

All laboratories must 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; to ensure facilitation of timely and accurate recording of data and test reports; and to ensure the timely delivery of test reports in an acceptable format to the Department.

All samples received at HQ Central Laboratory or an ITD District Laboratory for testing must be accompanied by a completed Sample Data form. The ITD-1044, Sample Information for Testing form, is used for all materials except as follows:

Table 120.00.1: Materials Not Covered by ITD-1044

Material	Sample Data Form	
Performance graded binder	ITD-859	Performance Graded Binder Sample Identification
Used lube oil samples	ITD-945	Preventive maintenance Oil Analysis Sample
Emulsified and all other asphalts	ITD-1045	Sample Data Sheet Emulsified Asphalt and Cutbacks

All of the required portion of the form must be completed. It is important to complete the Sample Data form as thoroughly as possible. Delays in testing can be avoided when complete information is included on the form.

At the time of receiving, the laboratory section coordinator checks the information on the Sample Data form for accuracy and makes necessary corrections or obtains additional information to complete the form by contacting the section submitting the material. In the unit, the sample is given a laboratory number and recorded in the log book.

At the completion of the testing, a test report will be published and distributed as explained herein. If the test report indicates the material is subject to rejection, there must be action taken to remedy the situation. The Standard Specifications, Subsection 105.03, specifies the material may be:

- Accepted and allowed to remain with a price adjustment
- Removed and replaced by the Contractor
- Corrected at the expense of the Contractor

120.01 Sample Identification. Department samples are identified by numbers followed by a letter to indicate the scope and use of the test results. The identification numbers signify specific materials and the letter signifies the type of test results. Sample Identification Numbers are shown in Table 120.01.1.

Table 120.01.1: Sample Identification Numbers

Sample	Identification Numbers
Soils	1 – 099
Quarry, Pit Run, and Crushed Gravel	101 – 199
Concrete Aggregates	201 – 299
Cement	301 – 399
Steel	401 – 499
Culvert Pipe	501 – 599
Road Mix and Plant Mix (from hot plant, roadway, etc.)	601 – 699
Joint Filler	701 – 799
Filler	801 – 899
Miscellaneous	901 – 950
Fly Ash	951 – 999
Concrete Cylinders (see Table 120.01.2)	10001 – 19999
*Asphalt, Performance Graded Binders and Emulsions	2001 – 2999

*Use ITD-1045 for emulsified asphalts and ITD-859 for Performance Graded Binder.

Concrete cylinders, other than 28-day breaks, are to be marked CX, Information only, unless otherwise specified.

Table 120.01.2: Concrete Cylinder Identification Numbers

Class (in MPa)	Class (in 100 psi)	ID Number
20.5 or lower	30 or lower	10001-10099
24.0	35	11001-11999
27.5	40	12001-12999
27.5A	40A	13001-13999
27.5B	40B	14001-14999
27.5C	40C	15001-15999
31.0	45	16001-16999
34.5	50	17001-17500
38.0	55	17501-17999
41.5	60	18001-18500
SEAL	SEAL	18501-18999
SP*	SP*	19001-19500
SP*	SP*	19501-19999

*Use this class for concrete over 40 MPa (6,000 psi) or any class other than those listed.

Concrete cylinders will be marked as follows:

28-day tests	A, B & C
7-day tests	D & E
Any additional tests	F, G, H, I, etc.

Do not use numbers larger than 20,000.

120.01.01 Control Samples (C). Control samples are indicated by the letter "C." Test results for control samples are either acceptable or subject to rejection as indicated in the report. (see Section 130.01)

120.01.02 Check Samples (CK). Check samples are indicated by the letters “CK.” The check samples are tested, with the unit supervisor’s concurrence, if the control sample test results indicate out-of specification material. The check sample must be from the same lot or batch as the original sample. The check samples are treated the same as control samples for publication of acceptance or subject to rejection. The check sample report will include a reference to the control sample laboratory number that is being checked. A passing check sample can replace a failing control sample with concurrence from the Central Laboratory Manager.

120.01.03 Information Only Samples (CX). Samples indicated by the letters "CX" are tested for information only. The material may be project related or product related.

120.01.04 Preliminary Engineering Samples (P). Some samples are taken for investigative reasons during project development. These samples are known as "P" samples, for preliminary engineering. The test results are for information only.

120.01.05 Qualification Samples (QUAL). These samples are known as “QUAL” samples and are submitted for qualification testing to be placed on an ITD-Qualified Products List. These samples are treated the same as control samples for publication.

120.02 Samples Received That Are Improperly Taken. Samples that are known to have been improperly taken will be treated as follows:

1. Receiving laboratory will log sample as usual and note “Improperly Sampled”
2. Receiving laboratory will send notification email to Sampler and Resident Engineer
    a. cc: Central Laboratory Manager, District IA Inspector (received at Central Lab)
    b. cc: District IA Inspector (received at District Labs) The email will include:

"The sample of _____ was received and noted as improperly taken because _____. This sample will not be tested. Another sample must be taken as soon as possible, using the correct sampling method, and immediately sent to the lab to replace this sample. Failure to meet the minimum sampling frequency and failure to follow the correct sampling method are deficiencies that can result in actions against the individual sampler and may affect the project funding."

1. The laboratory will complete a test report for the improper sample without any test results shown, but remarks will show the sample was not tested because it was improperly sampled.

2. Post (HQ pdf file) or distribute the test report as usual.

3. The District IA Inspector will complete a buff IA evaluation form, obtain resolution, and distribute according to the usual procedures, including a copy submitted to the ITD Sampler/Tester Qualification Committee (STQC) for action.

SECTION 130.00 – LABORATORY TEST REPORTS

Test results must be published in a format that will provide all the necessary information to satisfy project contractual requirements. When a sample is tested for a specific Department project, the project identification, sample identification, and quantity of material represented must appear with the test results on each test report. It is important that every sample tested have the test results published and made available to the Department for acceptance of the material.

130.01 Reporting of Test Results. Tests performed in the laboratory may be performed for different purposes which must be conveyed in the published test results. The following is a listing of identifiers describing the purpose of the test and an explanation of the results.

130.01.01 Reporting of Control (C), Check (CK), and Qualification (QUAL) Samples.

- Acceptable – Material is within specification limits.
- Nota Bene (NB) – (Latin for "to note well") Material is outside of specification limits but within specification tolerances, values are Near Border and attention is advised. Values are identified with the symbol "NB" and/or highlighted.
- Subject to Rejection – Material is outside allowable specification tolerances. Values are identified and/or highlighted.

130.01.02 Reporting of Information Only (CX) Samples.

- These test results are identified as information only.
- Material outside allowable specification limits will be identified and noted as Nota Bene (NB).

130.01.03 Reporting of Preliminary Engineering (P) Samples.

- These test results are for information only.

130.02 Checking Mathematical Computation on and Reasonableness of the Results on Laboratory Reports. A qualified person (i.e., the checker) is responsible for thoroughly reviewing all the data before submitting the laboratory reports. Reports will be initialed by the checker. If errors are found prior to publishing the test report, the test report will be returned to the tester for correcting and then rechecked. If the error is found after the test report has been published and distributed, then the procedure for correcting test reports must be followed.

With the advent of smart forms it is critical to confirm and check the input data, output data, and final results. With smart forms, unless a formula is corrupted or a link is broken, the mathematical calculations produce results that are mathematically correct. This makes the review of the final results critical. The checker must determine if the final results are true and reasonable (i.e., are the results that would normally be expected from the test performed).

All original computations are initialed by the person who performed them.

The Central Laboratory Manager or the District Materials Engineer will periodically review the calculations for Department laboratory test reports.

130.03 Correcting Test Reports. Do not make any changes on the original hard copy test report when correcting laboratory test reports. First, make a legible copy of the original and then make the changes on the copy. Use an arrow to point to the correction and note in the Remarks the change made. A new Date Mailed will be used on the corrected report. The new date will be placed below or to the right of the old date.

Electronic reports will have the correction highlighted and a comment added into the Remarks documenting the corrections and dates.

130.04 Recommendations for Price Adjustments. The Central Laboratory Manager will provide a letter or email of Recommendation for Price Adjustment that will accompany any laboratory test results that are out of specification and subject to rejection. The only exception is for items where a price adjustment is not appropriate and the material must be rejected.

130.05 Distribution of Laboratory Test Reports. Distribute Laboratory Test Results as follows:

- In all cases, the original laboratory test report will be retained at the laboratory that performed the testing.
- The Central Laboratory and each District Laboratory will maintain the test reports in the project files and in a numerical file for each year.
- Independent laboratories or Contractor's laboratories must provide copies of all test results when performing testing of materials that will be used or may be used for Department projects. These laboratories may not provide only selected test results and will be required to verify quality control procedures that guarantee accurate testing.

130.05.01 ITD District Laboratory Test Reports. District Laboratory reports will be distributed in the district only, unless the Central Laboratory specifically requests a copy. However, Independent Assurance Reports will still follow the distribution as shown on the forms.

130.05.02 HQ Central Laboratory Test Reports. Test reports will be posted in the district folder on the Department intranet for the district to view and print.

SECTION 140.00 – TESTING REQUIREMENTS FOR AGGREGATE MATERIAL SOURCES

The aggregate material in a source is evaluated for quality according to Standard Specifications, Section 703. The specifications for contractor-furnished sources provide that all costs will be borne by the contractor. Independent laboratories performing the testing will perform the same tests as would be conducted for the Department's own evaluation. The District Materials Engineer will determine if any specified testing may be unnecessary for specific aggregate items.

Refer to the Materials Manual, Section 300.13 – Aggregate Material Sources, and the Contract Administration Manual, Section 106.09 – Material Sources, for additional information about material sources.

SECTION 150.00 – TEST METHODS AND TEST MANUALS

150.00 Test Methods. The ITD Standard Specifications designate the test methods and practices (e.g., AASHTO, ASTM, WAQTC, IDAHO) used to evaluate the materials used by the Department. These test methods, some of which are copyrighted, are published by the respective agencies. Laboratories are required to have the current versions of the test methods when performing sampling and testing.

150.00.01 AASHTO Test Methods. The Central Laboratory maintains an AASHTO Test Methods website for Department personnel. See the following link: http://itdintranetapps/apps/ihs/ihs.aspx. Department personnel must not give AASHTO Test Methods to non-department personnel.

150.00.02 ASTM Test Methods. The Central Laboratory maintains an American Society for Testing and Materials (ASTM) Test Methods website for Department personnel. See the following link: http://compass.astm.org/CUSTOMERS/filtrexx40.cgi?index.frm. Department personnel must not give ASTM Test Methods to non-department personnel.

150.00.03 WAQTC Test Methods. The Construction/Materials Section is responsible for publishing and distributing the current versions of Western Alliance for Quality Transportation Construction (WAQTC) Test Methods that have been adopted by the Department and are contained in Section 570 of the QA Manual. These methods are found in Section 570 of the QA Manual.

150.00.04 Idaho Standard Methods and Practices. The Central Laboratory is responsible for publishing and distributing the current versions of standard practices (IR), and standard test methods (IT), unique to the Department, which are designated in the Standard Specifications as Idaho Test Methods. The publication or revision date month/year is indicated in the bottom margin of the test method. These methods are found in Section 500 of the QA Manual.

150.01 Field Operating Procedures (FOP). The Construction/Materials Section is responsible for publishing and distributing the current versions of field operating procedures (FOPs) that have been adopted by the Department and are contained in Section 570 of the QA Manual.

SECTION 160.00 AMRL & CCRL PROFICIENCY SAMPLES

The HQ Central Laboratory participates in the American Materials Reference Laboratories (AMRL) and Cement & Concrete Reference Laboratories (CCRL) proficiency sample program. Each of the ITD District Laboratories also participates in the AMRL program as part of the laboratory qualification requirements.

The schedule of proficiency samples is based on the testing performed by the individual District Laboratory. The District Materials Engineer will monitor the proficiency sample reports for the ITD District Laboratory to ensure reliability of laboratory testing and will maintain the report records. A copy of the district test reports and any corrective action resolutions will be sent to the Central Laboratory Manager.

FHWA receives notification from AMRL and CCRL of deficiencies of the HQ Central Laboratory. The Central Laboratory Manager will forward a copy of the corrective action to FHWA to show resolution was attained.

SECTION 200.00 – IDAHO TRANSPORTATION DEPARTMENT LABORATORY QUALIFICATION PROGRAM

The Idaho Transportation Department (Department) Laboratory Qualification Program was developed under the guidelines of 23 CFR Part 637, Construction Inspection and Approval. This program outlines the requirements necessary for qualification of a laboratory by the Department. To ensure that laboratories consistently provide valid test results, they must be qualified according to this program. As used in this program, the term "laboratory" means an individual test facility, fixed or mobile (i.e., a trailer or building temporarily located at a project site to test materials for Department projects is a laboratory and must be individually qualified under the program).

In all cases, an annual Department laboratory inspection is required for qualification under this program. The program recognizes four categories of laboratories that will test materials for Department construction projects:

1. Quality Control (QC)
2. Quality Assurance (QA)
3. Dispute Resolution
4. Design of Concrete and Asphalt Mixes.

Laboratories will either be owner occupied or those owned by others.

200.01 Laboratory Owner Occupied. All 3 of the following criteria must be satisfied in order to test materials for Department construction projects:

- The laboratory must develop and implement a quality management system (e.g., AASHTO R 18)
- Individuals performing the tests must be qualified
- Testing equipment must be calibrated

200.02 Laboratory Owned by Others. The following criteria must be satisfied in order to test materials for Department construction projects.

- The laboratory owner must develop and implement a quality management system (e.g., AASHTO R 18). See Table A-3.
- Testing equipment must be calibrated by the owner
- The operator is responsible for supplying qualified technicians.

200.03 Quality Management System (QMS). The Quality Management System and associated documentation must be developed and implemented whether it is for an individual laboratory or multiple laboratories owned by the same company. When multiple laboratories are owned by the same company, the quality system must include each separate laboratory and a companywide quality system.

200.03.01. Non-Calibrated, Non-Standardized, or Broken Equipment. Non-calibrated, non-standardized, or broken equipment must be tagged. No testing will be performed with non-calibrated or tagged equipment. Documentation on the disposition of all non-calibrated, non-standardized or tagged equipment shall be supplied to the Department.

200.04 AASHTO Accreditation. Non-Department laboratories preparing asphalt mix designs, independent assurance sampling and testing, and providing dispute resolution tests for Department projects must be AASHTO accredited for all tests performed.

SECTION 210.00 QUALITY CONTROL LABORATORIES

QC laboratories are laboratories under the direct control of the Contractor. QC of construction materials is the responsibility of the Contractor and is performed during the production of the material. Laboratories performing QC testing may be the following type:

- Owned and operated by the contractor
- Owned and operated by a material or product supplier
- Owned and operated by an independent testing laboratory hired by the contractor
- Owned by others and operated by the contractor

All levels of testing by the contractor or the contractor's designated laboratories to control the quality of a product are considered QC testing. When properly verified by QA testing, QC test results may be used for acceptance of material when specified in the contract.

210.01 Quality Control Laboratory Inspection Duties. ITD District Materials Engineer or their representative will inspect QC Laboratories for compliance to perform the QC tests used for acceptance of material in Department construction projects. Central Laboratory personnel are available to assist in qualifying independent testing laboratories when qualification is required for test methods the District personnel do not typically perform.

The inspection and qualification requirements for QC Laboratories are outlined in Section 230.01.

SECTION 215.00 QUALITY ASSURANCE LABORATORIES

QA is the responsibility of the Department. QA is planned and systematic actions that provide confidence the acceptance test results are reliable. Quality Assurance Laboratories are laboratories under the control of the Department and generally perform one or more of the following for Department construction projects:

- State acceptance testing
- Verification testing
- Independent Assurance (IA) testing

QA Laboratories will generally be the following types:

- ITD Field Laboratories
- ITD District Laboratories
- ITD Central Laboratory
- A local Highway District Laboratory
- A Department-contracted independent testing laboratory
- Owned by others and operated by the Department or its agent

215.01 Quality Assurance Laboratories Inspection Duties. The ITD District Materials Engineer or his/her representative will inspect Department field laboratories and IA laboratories located in Idaho in accordance with Section 230.01 for test methods necessary to perform QA tests of construction materials for Department construction projects. Central Laboratory personnel are available to assist in qualifying independent testing laboratories when qualification is required for test methods the District personnel do not typically perform.

If a laboratory is located in another state, qualification under the program of that state's transportation department or AASHTO accreditation may be accepted provided requirements of this program are met. Such a laboratory must furnish evidence of current qualified status for the applicable testing. The annual Department laboratory inspection is still required. HQ Central Laboratory personnel are available to assist in qualifying out-of-state laboratories.

The inspection and qualification of ITD District Main Laboratories and Local Highway District Laboratories are detailed in Section 230.02. Section 230.03 describes the qualification of the HQ Central Laboratory.

SECTION 220.00 DISPUTE RESOLUTION LABORATORIES

When QC and acceptance test results conflict and the conflict cannot be resolved, a neutral Dispute Resolution Laboratory may test the material in question provided the conditions of Section 106.07 of the Standard Specifications are met. The Dispute Resolution Laboratory will be either the Central Laboratory or an independent testing laboratory not currently testing on the project.

Dispute Resolution Laboratories must be AASHTO accredited for the test methods in dispute, if accreditation is offered by AASHTO for those methods. If AASHTO does not offer accreditation for the test methods in dispute, then other measures of proficiency will be reviewed. These might include other accreditation programs and/or participation in cooperative testing programs.

220.01 Dispute Resolution Laboratory Inspection Duties. Central Laboratory personnel will inspect and qualify all dispute resolution laboratories. The laboratory manager must contact ITD Central Laboratory Manager 60 days prior to testing dispute samples, and request inspection and qualification for those test methods where dispute resolution will be performed.

The qualification process will follow the procedures outlined in Sections 230.01.01 to 230.01.04, except the representative performing the inspection will be Central laboratory personnel and the qualification will be the ITD-926 HQ Issued Laboratory Qualification form.

SECTION 225.00 CONCRETE AND ASPHALT MIX DESIGN LABORATORIES

Non-Department laboratories submitting Asphalt Mixture (Hot Mix Asphalt (HMA), Warm Mix Asphalt (WMA)) designs, and Concrete Mix designs must be accredited and qualified under the Department's Laboratory Qualification Program.

The qualification process will follow the procedures outlined in Sections 230.01.01 to 230.01.04. The representative performing the inspection for Asphalt Mix Design Laboratories will be ITD Central Laboratory personnel and the qualification will be the ITD-926 form. The representative performing the inspection for Concrete Mix Design Laboratories will be ITD District Materials personnel and the qualification will be the ITD-922 form.

225.01 Asphalt Mix Design Laboratory Inspection. Central Laboratory personnel will inspect and qualify all Asphalt Mix design laboratories. The laboratory manager must contact ITD Central Laboratory Manager, and request inspection and qualification for those test methods needed to perform the mix design.

If a laboratory is located in another state, qualification under the program of that state's transportation department may be accepted provided requirements of this program are met. Such a laboratory must furnish evidence of current qualified status for the applicable testing to the Central Laboratory Manager. In addition to the state qualification, the testing laboratory must also hold a current AASHTO qualification for the tests needed to design mixes.

225.02 Concrete Mix Design Laboratory Inspection. Department Laboratory personnel will inspect and qualify all Concrete Mix design laboratories. The laboratory manager must contact the ITD District Materials Engineer and request inspection and qualification for those test methods needed to perform the mix design.

If a laboratory is located in another state, qualification under the program of that state's transportation department may be accepted provided requirements of this program are met. Such a laboratory must furnish evidence of current qualified status for the applicable testing to the Department. In addition to the state qualification, the testing laboratory must also hold a current AASHTO qualification for the tests needed to design mixes.

SECTION 230.00 LABORATORY QUALIFICATION PROCESS

The ITD Laboratory Qualification Program has a process to qualify all laboratories used for Department construction projects. Qualification is required for testing equipment used in materials acceptance decisions.

The following types of laboratories have different inspection and qualification requirements:

- The District Laboratories are responsible for inspection and qualification of QC Laboratories and ITD Field Laboratories.
- The Central Laboratory is responsible for annual inspection and qualification of ITD District Laboratories and Local Highway District Laboratories.

230.01 Inspection and Qualification Requirements for Quality Control Laboratories and ITD Field Laboratories. At the request of the laboratory manager, the ITD District Materials Engineer or representative will inspect the laboratory for qualification. The laboratory manager is responsible for requesting inspection at least 60 calendar days in advance of the date the qualification is needed to allow the ITD District personnel to conduct the inspection and issue the qualification prior to testing materials for Department construction projects. The laboratory manager is required to coordinate with the ITD District Materials Engineer in the inspection and qualification process. The laboratory manager will use Table A-1 of Appendix A to provide the list of test methods the laboratory is requesting for inspection and qualification.

The Department representative will inspect and assess the laboratory as detailed in the On-site Inspection Report of Appendix A. The Department representative may verify equipment calibrations, standardizations, and checks during the inspection in accordance with Section 260.00.

230.01.01 Preliminary Report. The Department representative will prepare a Preliminary On-site Inspection Report (Appendix A, ITD-921) following the inspection. The test methods for which the laboratory is requesting qualification will be listed on the report. The report will list any deficiencies identified during the inspection and the associated test method(s). The Department representative will discuss each deficiency noted in the preliminary report with the laboratory manager in sufficient detail so the laboratory manager understands the scope of the deficiency and what corrective action is required. Both parties will sign the preliminary report. These signatures indicate both parties have read and understand the report. The original Preliminary On-site Inspection Report is retained by the laboratory owner or manager and a copy is retained for the District file.

The Department does not issue partial, provisional, or stipulated laboratory qualifications. All requirements must be met for all test methods the laboratory intends to perform prior to qualification.

When deficiencies are identified in the preliminary report, the Department representative will, upon request of the laboratory manager, perform a re-inspection to confirm that all deficiencies were corrected.

230.01.02 Final Report. If there are no deficiencies identified during the inspection, or re-inspection, the Department representative will prepare a Final On-site Inspection Report (Appendix A; ITD-921) and submit it to the District Materials Engineer for review.

230.01.03 Certificate of Annual Laboratory Qualification. The District Materials Engineer will review the Final On-site Inspection Report to ensure all conditions for qualification have been satisfied and deficiencies have been corrected and will then prepare and issue the Certificate of Annual Laboratory Qualification (Appendix A, ITD-922).

The laboratory will be assigned a permanent ITD Laboratory Qualification Number that will be written on the Certificate of Annual Laboratory Qualification. The permanent ITD Laboratory Qualification Number will be a four-digit number beginning with the number of the district that qualifies the laboratory (e.g., District 1 will use 1000 series, District 2 will use 2000 series, District 3 will use 3000 series, etc).

The Department will affix a number plate to the qualified QC Laboratory. When the laboratory is moved to a different district, the original ITD Laboratory Qualification Number will be retained and the number plate will remain affixed to the laboratory. The number plate will remain affixed if the laboratory is sold. The only situation for removal of the number plate is when the laboratory is retired or disposed of. The number plate remains the property of the Department and must be returned to the Department when removed. The ITD Laboratory Qualification Number will be used in a central database to list qualified laboratories.

The Certificate will include the laboratory name and the test methods the laboratory has been qualified to perform, and will be signed by the Department representative and the District Materials Engineer. The Certificate of Annual Laboratory Qualification is proof of a laboratory's Department qualification for the listed test methods. Unless otherwise noted, the laboratory qualification will be valid for one year from the date on the qualification certificate. The Final Onsite Inspection Report and the Certificate of Annual Laboratory Qualification will be sent to the laboratory within 21 calendar days following the final inspection.

Copies of the Final Onsite Inspection Report and the Certificate of Annual Laboratory Qualification will be distributed to Central Laboratory and to the District Materials file. Distribution to the District Regional/Resident Engineer is recommended when the laboratory is scheduled to be used for testing on an identified project.

230.01.04 Follow Up On-site Inspections. The Central Laboratory or district personnel at the Department may perform an on-site inspection of a qualified laboratory at any time. Scheduled IA evaluations are considered on-site inspections on testing equipment and testing personnel. Deficiencies identified will be handled as described in Section 270.00, Laboratory Disqualification.

230.02 ITD District Laboratories and Local Highway District Laboratories. The Central Laboratory is responsible for annual inspection and qualification of ITD District Laboratories and Local Highway District Laboratories. Qualification is required for those test methods used in the acceptance decision for materials used for Department construction projects.

230.02.01 Inspection and Qualification Requirements for ITD District Laboratories and Local Highway District Laboratories. Central Laboratory personnel will perform the following functions annually for each laboratory:

Inspect the laboratory for the requirements of Appendix A including conformation that equipment calibrations, standardizations, or checks have been performed and documented as outlined in the program for all tests the laboratory performs.

Spot evaluate equipment calibrations, standardizations, and checks in accordance with Section 260.00.

Qualify the laboratory personnel performing test methods not covered by a recognized testing technician qualification program (e.g., WAQTC, ACI.) as shown in Section 250.00. Observe other test methods not shown in Section 250.00 to ensure proper procedures.

Observe the laboratory personnel performing selected WAQTC or other test methods as identified (OPTIONAL)

- For ITD District Laboratories, Central Laboratory personnel will inspect and conduct an audit for QMS compliance at a minimum annually. Including a review of AASHTO AASHTO re:source Proficiency Sample files for conformance with program requirements

230.02.01.01 Laboratory Inspection Report. Following laboratory inspection, a detailed inspection report including noted deficiencies will be forwarded to the District Engineer and the District Materials Engineer (or laboratory manager for Local Highway District Laboratories).

The laboratory will have 45 days after the date of the report to notify the Central Laboratory of the resolution of the deficiencies. When deficiencies are not corrected or the requirements of the program are not met, they will be handled as described in Section 270.00, Laboratory Disqualification. A notice of disqualification will be sent to the District Engineer and the District Materials Engineer (or Laboratory Manager for Local Highway District Laboratories).

230.02.01.02 Headquarters Issued Laboratory Qualification. Once all deficiencies are adequately addressed, the Central Laboratory Manager will issue the Certificate of HQ Issued Laboratory Qualification (Appendix A, ITD-926). The certificate will show broad categories of qualification rather than list every test method; however, the inspection report must document each test method qualified. An intranet website listing the test methods the districts are qualified to perform will be maintained by Central Laboratory. Laboratory Qualification for ITD District and Local Highway District Laboratories are valid for one year.

230.02.02 ITD District Laboratory Operations. The District Materials Engineer is responsible for ensuring the requirements of the program are met for laboratory qualification, including ensuring equipment calibrations, standardizations, and checks are completed and documented at the frequencies required in this program.

The Central Laboratory will coordinate annual statewide calibration/standardization contracts as required.

The District Materials Engineer must ensure laboratory testing technicians are qualified per Section 250.00. The District Materials Engineer should periodically evaluate the laboratory testing technician's performance. Testing technician qualification and evaluations must be documented.

ITD District laboratories are required to participate in the AASHTO AASHTO re:source proficiency sample program based on the testing performed by the individual District Laboratory.

Participation in the AASHTO re:source Proficiency Sample program is required for ITD District Laboratory Qualification. The District Materials Engineer will monitor the proficiency sample reports to ensure reliability of laboratory testing. The District Materials Engineer will maintain a file of all AASHTO re:source sample test reports submitted to AASHTO re:source and the preliminary and final AASHTO re:source Reports. Any result that is beyond two standard deviations from the average is deemed poor. Proficiency sample reports are rated on a scale from 0-5 and scores of 0, 1 and 2 require a written Corrective Action Report (AASHTO re:source provided on-line) response to the file. When poor results are reported, the District Materials Engineer will do the following within 60 days of the date of the final report:

- Investigate to determine the reason(s) for the poor results
- Document the results of the investigation and any corrective actions taken
- Maintain records of the investigation and the corrective action report
- Provide copies of AASHTO re:source test results including ratings, investigation, and corrective action report to the Central Laboratory Manager.

230.02.03 Local Highway District Laboratory Operations. The Local Highway District Laboratory manager is responsible for ensuring the requirements of the program are met for laboratory qualification, including ensuring that equipment calibrations, standardizations, and checks are completed and documented at the frequencies required in this program.

The Local Highway District Laboratory manager must ensure laboratory testing technicians are qualified per Section 250.00. The Local Highway District Laboratory manager should periodically evaluate the laboratory testing technician's performance. Testing technician qualification and evaluations must be documented.

230.03 Central Laboratory. The Central Laboratory is accredited through the AASHTO Accreditation Program (AAP)and participates in the AASHTO re:source and CCRL proficiency sample programs. The specifics of the Central Laboratory accreditation are contained in the Laboratory QC Binder at Central Laboratory. AASHTO accreditation is in accordance with the AAP Procedures Manual and AASHTO R 18 "Standard Recommended Practice for Establishing and Implementing a Quality System for Construction Materials Testing Laboratories". The Central Laboratory Manager must ensure laboratory testing technicians are qualified per Section 250.00.

SECTION 240.00 CONFLICT OF INTEREST

In order to avoid an appearance of a conflict of interest, any non-Department laboratory is allowed to perform only one of the following types of testing on the same project:

- Quality Assurance (Verification and/or Acceptance)
- Quality Control
- Independent Assurance
- Dispute Resolution

All levels of testing by the Contractor or Contractor's designated laboratories to control the quality of a product are considered QC testing. When properly verified by QA testing, QC test results may be used for acceptance of material when specified in the contract.

The laboratory performing QC testing is allowed to prepare mix designs for the same project as long as they meet the requirements of Section 225.00 of the Laborataory Operations Manual.

The laboratory performing QA testing is allowed to prepare mix designs for the same project as long as they do not perform QC testing, IA testing, or dispute resolution testing, and meet the requirements of Section 225.02 of the Lab Operations Manual.

The Federal law specifies no laboratory may perform both QC and QA testing for the same construction project.

SECTION 250.00 Qualification Requirements for Personnel Who Perform Sampling and Testing

Refer to the QA Manual, Section 590.

SECTION 260.00 CALIBRATION, STANDARDIZATION, AND CHECK REQUIREMENTS FOR TESTING EQUIPMENT

All Laboratories are required by the provisions in AASHTO R 18 to maintain a list giving a general description of equipment that requires calibration, standardization, or checks. For equipment not specifically addressed in AASHTO R 18, use AASHTO R 61. This section, Appendix A, and Appendix B provide the information necessary to comply with the provisions of AASHTO R 18.

260.01 Equipment Requirements. Equipment used to test materials for Department construction projects must be calibrated, standardized, and checked at the frequencies required in Table A-2 of Appendix A. These terms are defined in the following sections. Table A-1 of Appendix A lists each test method and the equipment associated with performing the test method. The equipment shown in bold for each test method on Table A-1 requires calibration, standardization, or check under this program. Appendix B provides the required procedures and sample worksheets for documenting this process.

260.01.01 Calibration. A set of operations that establish, under specified conditions, the relationship between values of quantities indicated by a measuring instrument or measuring system, or between values represented by a material measure or a reference material, and the corresponding values realized by standards. Calibration allows equipment adjustment to an exact standard (e.g., scales and balances).

260.01.02 Standardization. A process that determines:

1. The correction or correction factor to be applied to the result of a measuring instrument, measuring system, material measure, or reference materialwhen its values are compared to the values realized by standards.
2. The adjustment to be applied to a piece of equipment when its performance is compared with that of an accepted standard or process. Standardization creates a correction for equipment to a known standard (e.g., thermometers, unit weight buckets, ovens).

260.01.03 Check. A specific type of inspection and/or measurement performed on the physical properties of equipment and materials to determine compliance or otherwise with stated criteria. Checks are performed on equipment that cannot be adjusted, altered, or modified to meet a standard (e.g., sieves, slump cones, sand equivalent shaker).

260.01.04 Other Considerations. Equipment for which there is not an established procedure or frequency for calibration, standardization, but that requires a certain precision (e.g., graduated cylinder or strike off plate.), must be evaluated (checked) for meeting the precision requirements upon placing the equipment into service and routinely thereafter, but does not require documentation. Newly purchased equipment or equipment acquired from other sources without existing records must be calibrated, standardized, or checked before being placed in service per the requirements of Table A-2.

In some cases equipment calibration or standardization by a commercial calibration service is required. This means the calibration or standardization is performed by hiring a company that has certified standard measuring devices and has qualification from a recognized laboratory accreditation program (e.g.,ISO, ANSI, NIST) to perform this process. Measuring equipment used in equipment standardization and calibration must be checked annually using NIST-traceable standards.

Equipment calibration, standardization, and checks must be performed by properly qualified personnel or by a commercial calibration service.

Each piece of laboratory test equipment must be permanently marked or labeled to clearly identify the piece of equipment for the laboratory's inventory record.

If laboratory test equipment is overloaded, mishandled, giving results that are suspect, or is not meeting specification tolerances, the lab supervisor will remove it from service and mark it by attaching a clearly visible tag or ribbon. The equipment will be returned to service only after appropriate repairs are made and calibration, standardization, or check shows the equipment to function satisfactorily or to meet specification tolerances.

As a requirement for Laboratory Qualification under this program, every testing laboratory must:

- Maintain an equipment inventory (ITD-920) of all the equipment, including the date when the calibration, standardization, or check was performed, and the date the equipment was placed and removed from service.
- Use calibration, standardization, or check worksheets to document each step of the associated procedure and record any associated measurement and/or calculations. See Appendix B for procedures and worksheets.
- Maintain the documented record from the commercial calibration service of any equipment they calibrated, standardized, or checked. Documentation includes the name and date of the person who performed the procedure as well as the name of the accredited organization where the person received their qualification to perform calibrations, standardizations, and checks.
- Keep up-to-date equipment inventory (ITD-920) and calibration, standardization, and check worksheets on the premises of the laboratory at all times for inspection.
- Include IA test reports (copy of ITD-857) in the laboratory records.

260.02 Laboratory Equipment Documentation. Every testing laboratory must have complete documentation as outlined above available on the premises of the laboratory at all times. Usually this consists of a binder containing all the required documents organized as indicated above (e.g., equipment inventory, calibration, standardization, and check worksheets and IA evaluations). The current Department-issued laboratory qualification certificate and final inspection report must also be included.

SECTION 270.00 Laboratory Disqualification

270.01 Disqualification. Disqualification can occur when any or all of the following deficiencies are found:

- Lack of compliance with the laboratory QMS
- Use of non-qualified samplers/testers,
- Use of non-calibrated, non-standardized, non-checked or tagged equipment
- Fraud, and/or misconduct.

270.02 Disqualification Process. The Idaho Sampler/Tester Qualification Committee (STQC) may disqualify a laboratory at any time. All actions taken by the STQC may be applied to an individual laboratory or all laboratories operated under the same QMS.

The process for disqualification will start with a written submittal to the STQC chairman. Such a request should contain information regarding who was involved, when the incident happened (date), what was observed, and the name, address, and telephone number of the person making the report.

Within 100 days of receipt of the request, the STQC will review for merit. If the information has merit, the STQC will perform an investigation. A letter detailing the incident will be sent to the laboratory in question. The laboratory will be given an opportunity to respond in writing within 15 working days. The STQC will review the laboratory's response and may conduct additional interviews. At any point in the process if the STQC determines that insufficient evidence exists to continue the investigation, the matter will be dismissed.

Upon receipt of all information and responses as outlined above, the STQC will make a determination as to whether the violation falls under the definition of either Negligence or Abuse.

> *Negligence* is defined as unintentional deviations from approved procedures or the unintentional failure to follow the requirements of the ITD Laboratory Qualification Program (e.g., unintentional use of damaged or non-calibrated, non-standardized, non-checked equipment, unintentional expiration of annual qualification, or untidy laboratories).
>
> *Abuse* is defined as intentional deviations from approved procedures or the intentional failure to follow the requirements of the ITD Laboratory Qualification Program. This would include habitual negligence, and not correcting deficiencies as outlined in Section 270.01.

Once a determination has been reached on the category of the violation, the appropriate process outlined below will be followed.

270.02.01 General Procedures Applicable to Both Categories of Violations. A letter of determination will be mailed to the laboratory in question. The notice will also contain an explanation of the laboratory's right to appeal the decision, the procedure for an appeal, and the time frames within which the appeal must be filed.

A disqualification is effective upon mailing of the notice to the laboratory and is effective unless modified or vacated following an appeal.

270.02.01.01 Process for Neglect. Neglect is less severe than abuse and should be resolved in a positive fashion so that learning and increased knowledge can happen. The complaint process for neglect is intended primarily to allow a means of tracking the types of problems and issues being encountered.

A single incident of neglect may be resolved through intervention by the District Independent Assurance Inspector (IAI). The IAI will supply clarification to the laboratory on proper testing, equipment calibration, standardization, and check techniques per the QA Manual. A copy of the District Independent Assurance Inspectors Report Field Evaluation (ITD-857) will be sent to the STQC. The STQC will maintain a file containing those incidents.

If an incident of neglect is found to be significant in nature, the STQC will issue a letter requiring a corrective action plan be developed by the laboratory to help avoid further incidents. The STQC will send out a notice to all the District IAIs of the issue. This notification is intended to help make the IAIs aware of particular problems being encountered.

Cases of repeated incidents of neglect or multiple incidences of the same type of neglect may be determined as habitual in nature, raising the current incident to the abuse category.

270.02.01.02 Process for Abuse. The STQC 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.

The first level of abuse is the least severe. This level would typically be identified as intentional deviations from approved procedures with no evidence of intent to misrepresent the quality of material being incorporated in the project. This level of abuse could result in up to a 180-day disqualification. The exact duration of the disqualification will be set by the STQC depending on the circumstances encountered. A second incident of this level of abuse within a three-year period would result in a minimum one-year disqualification.

The second level of abuse is much more severe and is identified by intentional deviations from approved procedures with the intent to misrepresent the quality of material being tested. This level of abuse will be dealt with by a minimum of one-year disqualification and up to a permanent disqualification. A second instance of this level of abuse will result in permanent disqualification of the laboratory.

270.02.01.03 Process of Appeal. After receiving notification of disqualification, the laboratory will be given an opportunity to appeal in writing within 15 working days of the date of the decision letter. Such an appeal must state the factual basis for the appeal and the reasons the appellant believes the decision was in error. Written appeals shall be directed to the ITD Division of Engineering Products & Plans Administrator.

A copy of the notice of appeal will be delivered to the STQC Chairman upon receipt. Within 15 days of the receipt of the notice of appeal, the STQC Chairman or his/her designee will file a reply to the appeal to the Division of Engineering Products & Plans Administrator.

A decision will be sent within 45 days of the receipt of the notice of appeal. The decision of the Division of Engineering Products & Plans Administrator will be final.

SECTION 280.00 ACCESS

Laboratory facilities, equipment calibration, standardization, check records, and test data applicable to Department projects and the laboratory Quality Management System documents will be accessible to Department personnel at all times. Failure to produce records may constitute disqualification.

SECTION 290.00 – APPENDIX CONTENT

Appendix A: The forms and references found in Appendix A are as follows:

Table A-1: **Test Methods & Equipment.**

This table lists test methods covered under the program and lists the equipment associated with each test method. Equipment that requires calibration, standardization, or check under this program is shown in bold.

The table has a column to indicate the required qualification for Sampler and Tester personnel.

Table A-2: Equipment, Calibration, Standardization, or Check Procedures & Frequency.

This table lists the equipment requiring calibration, standardization, or check; the required calibration, standardization, and check procedure, and the required calibration, standardization, and check frequency.

Table A-3: Procedure Checklist AASHTO R-18 Quality Systems Manual.

This table lists the requirements outlined in AASHTO R-18 for the Quality Systems Manual.

Table A-4: Forms. This table lists the Forms used in Section 200.

Appendix B: The forms and references found in Appendix B are as follows:

Table B-1: **Calibration, Standardization, and Check Procedures & Worksheets.**

This table listed the calibration, standardization and check procedures the associated sample worksheets.

The laboratory is required to use the calibration, standardization, and check procedures shown for the equipment but the actual worksheet is optional as long as the same information is documented when performing the calibration, standardization, and check procedures.

Table A-1: Test Methods and Equipment

√	Test Methods	Sampler / Tester qual	Equipment Used – Calibration, Standardization, or Check Required Bold
	Aggregates		
	FOP for AASHTO T 11 Wash fines	AgTT	**Balance** / **Sieves** / Container / **Oven** / Wetting Agent
	FOP for AASHTO T 19 Bulk Density ("Unit Weight") and Voids in Aggregate	Individual	**Balance** / Tamping Rod / Measure, Shovel Or Scoop / Standardization Equipment (Plate Glass) / **Measure**
	FOP for AASHTO T 27 Gradation	AgTT	**Balance** / **Sieves** / **Mechanical Shaker** / **Oven**
	FOP for AASHTO T 84 Specific Gravity and Absorption of Fine Aggregate	Individual	**Balance** / **Pycnometer** / **Specific Gravity Mold and Tamper**
	FOP for ASHTO T 85 Specific Gravity and Absorption of Coarse Aggregate	EbTT	**Balance Or Scale** / **Sieves**
	IT-144 Specific Gravity and Absorption of Fine Aggregate Using Automatic Vacuum Sealing (CoreLok) Method	Individual	**Balance / Oven / Pycnometer / CoreLok**
	AASHTO T 96 L. A. Wear	N/A	**L.A Abrasion Machine / Steel Spheres / Sieves / Oven / Balance**
	FOP for AASHTO T 176 Sand Equivalent	AgTT	**Sand Equivalent Apparatus**
	FOP for AASHTO R 76 Splitting	AgTT	**Mechanical Splitter** / **Straightedge** / Scoop / Shovel / Broom / Canvas Blanket
	FOP for AASHTO T 255 Moisture	AgTT	**Balance** / **Oven** / Sample Container / Stirrer
	FOP for AASHTO T 265 Moisture	EbTT	**Balance / Oven** / Containers
	FOP for AASHTO T 304 Uncompacted Void Content – Fine Aggregate Angularity	Individual	**Cylindrical Measure** / Funnel And Stand / Glass Plate / **Balance** / Pan, Metal Spatula
	FOP for AASHTO T 335 Fracture	AgTT	**Balance** / **Sieves** / **Splitter**
	IT-72 Cleanness Value	Individual	**Balance** / **Sieves** / **Splitter** / Graduated Plastic Cylinder / SE Stock Solution / Washing Vessel
	Idaho FOP for ASTM D4791 Flat or Elongated Particles in Coarse Aggregate	Individual	Proportional Caliper Device / **Balance**
	IT-74 Vibratory Spring-Load Compaction for Coarse Granular Material	N/A	Vibratory spring loaded Compactor / Mold Piston, **Molds,** Tamping rod**, Balance / Scale, Oven, Sieve**

Table A-1: Test Methods and Equipment

√	Test Methods	Sampler / Tester qual	Equipment Used – Calibration, Standardization, or Check Required Bold
	Bituminous Materials		
	FOP for AASHTO T 30 Mechanical Analysis of Extracted Aggregate	AsTT or ASTT II	**Balance Or Scale** / **Sieves** / **Mechanical Shaker** / **Oven** / Containers And Utensils / Wetting Agent
	AASHTO T 59 Saybolt Viscometer IDAHO IT-61	Individual	**Viscometer** / **Sieve** / **Thermometer** / **Constant Temperature Bath**
	ASTM D1075 Immersion-Compression (AASHTO T-165)	Individual	**Constant Temperature Bath / Balance /** Rigid transfer plate / **Immersion – Compression Mold**
	AASHTO T 167	Individual	**Constant Temperature Bath / Balance / Immersion – Compression Mold**
	FOP for AASHTO T 166, Method A or Method C,	AsTT or ASTT II	**Scale / Oven / Constant Temperature Bath**
	FOP for AASHTO T 209 Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures	AsTT or ASTT II	**Balance Or Scale** / **Constant Temperature Bath** / **Thermometer** / **Timer** / Containers, Utensils / **Vacuum Pump & Gauge, Lid (Vacuum System) / Gravity Bowl**
	AASHTO T 283 Moisture Susceptibility	Individual	**Constant Temperature Bath / Balance /** Rigid transfer plate / **TSR Mold**
	FOP for AASHTO T 308 Method for Determining the Asphalt Content of Hot Mix Asphalt (HMA) by the Ignition Method	AsTT or ASTT II	**Ignition Oven** / Sample Basket assembly with Catch Pan / **Oven** / **Balance** / Misc. Spatulas, Bowls, Brushes
	FOP for AASHTO T 343 Density of In-Place (HMA) Pavement by Electronic Surface Contact Devices	Individual	**Electronic Density Gauge**
	FOP for AASHTO R 47 Reduce HMA	AsTT or ASTT II	Scoop / Non-Stick Mat / Trowels, Etc.
	FOP for AASHTO T 312 Gyratory Compactor	ASTT II	**Gyratory Compactor, molds**
	FOP for AASHTO T 329 Moisture	AsTT or ASTT II	**Balance** / **Oven** / **Thermometer** / Container
	FOP for AASHTO T 355 Density	DTT	**Nuclear Density Gauge**

Table A-1: Test Methods and Equipment

√	Test Methods	Sampler / Tester qual	Equipment Used – Calibration, Standardization, or Check Required Bold
	Concrete		
	FOP for AASHTO T 22 Compressive Strength of Cylindrical Concrete Specimens	CLTT	**Test Machine** / **Bearing Blocks** / **Load Indicator** / **Constant Temperature Bath**
	FOP for AASHTO T 23 Method of Making and Curing Concrete Test Specimens in the Field	CTT / ACI-CFT	**Initial Curing Facility** / **Thermometer /** Single Use Mold
	FOP for AASHTO T 119 Slump	CTT / ACI-CFT	**Slump Cone** / **Tamping Rod**
	FOP for AASHTO T 121 Unit Wt., etc.	CTT / ACI-CFT	**Balance** / **Tamping Rod** / **Measure**
	FOP for AASHTO T 152 Air content	CTT / ACI-CFT	**Air Meters** / **Measuring Bowl** / **Cover Assembly** / **Calibration Vessel** / Spray Tube / Trowel / **Tamping Rod** / Mallet / **Strike-Off Bar** / **Strike-Off Plate** / Funnel / Measure For Water / **Sieves**
	AASHTO T 231 Capping Cylindrical Concrete Specimens	CLTT	**Capping Plates** / **Alignment Devices** / **Capping Compound / Cylinder Capping Mold**
	ASTM C1231 Use of Unbonded Caps in Determination of Compressive Strength of Concrete Cylinders.	CLTT	Unbonded caps / Retaining Ring
	FOP for AASHTO T 309 Temperature of Freshly Mixed Concrete	CTT / ACI-CFT	**Thermometer**
	FOP for AASHTO R 64 Sampling & Fabrication of 2" Cube Specimens using Grout or Mortar	Individual	**Cube Molds /** Tamper / Trowel / Clamps

Table A-1: Test Methods and Equipment

√	Test Methods	Sampler / Tester qual	Equipment Used – Calibration, Standardization, or Check Required Bold
	Soils		
	AASHTO T 89 Determining the Liquid Limit of Soils	Individual	**Balance** / **Oven** / **Liquid Limit Device / Grooving Tool**
	AASHTO T 90 Determining the Plastic Limit and Plasticity Index of Soils	Individual	**Balance** / **Oven**
	FOP for AASHTO T 99 Moisture Density Curve	EbTT	**Molds** / **Rammer** / Sample Extruder / **Balance & Scale** / **Oven** / **Straightedge** / Mixing Tools / Containers
	AASHTO T 100 Specific Gravity of Soils	Individual	**Pycnometer** / **Balance** / **Oven** / **Thermometer**
	FOP for AASHTO T 180 Moisture Density curve	EbTT	**Molds** / **Rammer** / Sample Extruder / **Balance & Scale** / **Oven** / **Straightedge** / Mixing Tools / Containers
	AASHTO T 288 Determining Minimum Laboratory Soil Resistivity	N/A	**Balance / Oven / Sieves /** Pulverizing Apparatus / **Splitter**
	AASHTO T 289 Determining pH of Soil for Use in Corrosion Testing	N/A	**Sieves** / **Balance** / **Oven** / Pulverizing Apparatus / **Splitter**
	FOP for AASHTO T 310 Density	DTT	**Nuclear Density Gauge**
	Idaho IT-8 Compaction of Soils and Soil Mixtures for the Expansion Pressure and Hveem Stabilometer Tests	N/A	**Mechanical Kneading Compactor / Soil (R-Value) Molds**

Table A-2: Equipment, Calibration, Standardization, or Check Procedures & Frequency			
Equipment	**Required Procedure & Worksheet Number**		**Frequency(months)**
Air Meter	ITD-S102	27	3
Balance	Commercial	-	12
Bearing Blocks	ITD-S103	30	12
Calipers	Commercial	-	12
Capping Compound	ITD-S014	28	12
Constant Temperature Bath, Water or Oil	ITD-B24	15	12
Const. Temp Bath for Concrete / Cement	ITD-S108	24	6
Concrete Capping Stand	ASTM C617	32	12
Cylinder Capping Molds	ITD-S107	29	12
Followers, Plungers, Shims, Rods	ITD-D20	11	12
Furnace, Ignition	Commercial	-	12
Furnace, Ignition (Balance Verification)	ITD-NCAT1	9	Monthly when in use or when moved
Furnace, Ignition (Air Flow Check)	ITD-NCAT1	9	Weekly when in use
Gravity Bowls	ITD-D21	10	12
Gyratory Compactor	Commercial	-	12
Kneading Compactor	Commercial	-	12
L. A. Wear Machine	ITD-D1	21	24
L. A. Wear Steel Spheres	ITD-D1	21	24
Liquid Limit Device and Grooving Tool	AASHTO T 89	19	12
Micrometers	Commercial	-	12

Mold, 2 inch cubes	ASTM C109	31	12
Mold, Gyratory, including Top and Bottom Plate	Commercial	-	12 months or 80 hours use
Mold, Immersion / compression	ITD-D19	13	12
Mold, Moisture Density (Proctor)	ITD-D42	16	12
Mold, Soils (R-value)	ITD-D42	13	12
Unbonded Caps	ASTM C1231	34	12
Nuclear Gauges	Commercial	-	24
Oven, Drying	ITD-2	1	12
Pycnometer	ITD-D37	20	12
Rammer, Manual Moisture Density	ITD-D40	17	12
Rammer, Mechanical	ITD-D41	17	12
Sand Equivalent Apparatus	ITD-D3	3	12
Scale	Commercial	-	12
Shaker, Mechanical Coarse & Fine	ITD-D5	2	12
Wire Cloth Sieves	ITD-D11	4	12
Sieves	ITD-D11	5	12
Slump Cone	ITD-S105	23	12
Specific Gravity Mold & Tamper	ITD-D6	18	12
Splitter (Riffle)	ITD-D7	6	12
Stabilometer	Commercial	-	12
Straight Edge	ITD-D43	8	12
Universal Test Machine Compression/Tension	Commercial	-	12
Thermometer	ASTM E77	26	12

Temperature Recorder	ITD-B22	26	6
Timer	ITD-D9	7	12
Unit Weight Bucket	ITD-D10	25	12
Unbonded Cap Retaining Ring	ASTM C-1231	33	12
Vacuum System	ITD-D18	12	12
Viscometer, Saybolt	ITD-B26	14	36
Core Lok	ASTM D 6752		3

Table A-3: Procedure Checklist AASHTO R-18 Quality Systems Manual.				
Quality Management System		**P**	**F**	**N/A**
1.	QMS available for use and understood by staff			
2.	Organization and Organizational Policies available			
3.	QM contains the legal name and address of the CML			
4.	Quality system policy statement and objectives – set by management			
5.	Brief biographical sketch available			
Document Control				
6.	Preparation – revision date indicated			
7.	Test Methods and Procedures are the most current and are readily accessible employees performing the work			
Organization				
8.	Technical manager named that has overall responsibility for the technical operations of the laboratory – backup named in case of managers absence			
9.	Person listed having responsibility for determining if quality system implementation activities are being conducted – has direct access to top management. Management reviews the quality system annually, and whenever a technical complaint casts doubt			
Technician Training				
10.	Procedure to describe method used to ensure personnel are trained to perform test			
11.	Document shall indicate position responsible for training and maintenance of records			
Internal Audit				
12.	Document describing scope of Internal Audit			
13.	Verify lab's operation comply with its policy and procedures and standards			
14.	Frequency of review and identification of responsible person for review			
15.	Conducted at least every 12 months by personnel independent of activity being audited			
16.	Findings documented			

Corrective Action		**P**	**F**	**N/A**
17.	Procedure for corrective action for nonconforming work			
18.	Equipment Calibration and Checks Available			
Record Retention				
19.	External assessments, internal audits, proficiency sample testing, technician training and evaluation records available minimum of 5 years			
20.	QMS Records Retention shall be retained for a minimum of 5 years			
21.	Test records maintained includes, calculations, derived data and identification of technician retained for a minimum of 5 years			
Equipment				
22.	Inventory of equipment, name, date placed in service, manufacturer, model and serial number			
23.	Equipment calibration and check records maintained, details of work performed, date performed, previous and next due date, calibration procedure used and check equipment			
24.	Methods for ensuring that the calibration and check procedures are performed with individual responsible			
25.	In house equipment calibration and check procedures, when they cannot be referenced inapplicable standards			
26.	Certificates or other documents that establish the traceability of in house equipment or reference standards used in calibration			
Sample Management		**P**	**F**	**N/A**
27.	Typical test report forms which illustrate the manner in which tests results and supporting information available			
28.	Document describing procedures for sample identification, storage			
Test Records				
28.	Methods used to produce test records and to prepare, check and amend test reports			
30.	Records contain sufficient info to permit verification of data			
31.	Document describing the policies which the lab follows relative to subcontracting			

Assuring Quality of Results		**P**	**F**	**N/A**
32.	Documents describing participation in proficiency sample and on site assessment programs, methods used to identify poor results and procedures available			
33.	Root cause analysis for non-conformities and corrective action taken			

Table A-4: Forms

Form Name and Number	Purpose of the Form
ITD-921: On-site Inspection Report	This form is used by the ITD representative to evaluate laboratories for qualification.
ITD-920: Laboratory Testing Equipment Inventory	This form is used to record the laboratory inventory of testing equipment and date of calibration.
ITD-922: Annual Laboratory Qualification Certificate	This form is used by ITD District Materials to qualify laboratories.
ITD-926: HQ Issued Laboratory Qualification Certificate	This form is used by ITD Central Laboratory to qualify laboratories.
ITD-949: Individual Technician Qualification	This form is used by both ITD Central Laboratory and ITD District Materials to qualify sampler / tester personnel for non-WAQTC test methods.

Table B-1 – Calibration, Standardization and Check Procedures & Worksheets

Procedures	Worksheets	Equipment
1	1	Drying Oven Temperature
2	2	Mechanical Sieve Shaker
3	3	Sand Equivalent Apparatus
4	4	Wire cloth sieves
5	5	Sieves
6	6	Splitter (Riffle)
7	7	Timer
8	8	Straight Edge
9	9	Ignition Furnace Equipment
10	10	Maximum Theoretical Specific Gravity Bowl
11	11	Plungers, Followers, Supports, Shims and Rods
12	12	Vacuum System
13	13	Immersion / Compression Molds
13	13	Soil (R-Value) Molds
14	14	Idaho Degradation
14	14	Saybolt Viscometer Add to manual
15	15	Constant Temperature Bath, Water or Oil
16	16	4” Moisture Density (Proctor) Mold
16	16	6” Moisture Density (Proctor) Mold

17	17	5.5 lb Manual Rammer
17	17	10 lb Manual Rammer
18	18	Specific Gravity Mold & Tamper
19	19	Liquid Limit Device and Grooving Tool
20	20	Soil Pycnometer
21	21	L.A. Abrasion
21	21	L.A. Abrasion Charge (Steel Spheres)
22	22	Mechanical Soil Compactor
23	23	Slump Cone
24	24	Constant Temperature Bath for Concrete & Cement Specimens
25	25	Unit Weight Measure Bucket
26	26	Thermometer or Temperature Recorder
27	27	Air Meter, Pressure Type Concrete
28	28	Capping Compound
29	29	Cylinder Capping Mold
30	30	Bearing Blocks
AASHTO T 106	31	Cube Mold
AASHTO T 231	32	Concrete Capping Stand
ASTM C1231	33	Unbonded Cap Retaining Ring
ASTM C1231	34	Unbonded Cap
AASHTO T 344, ASTM D7115	35	Procedure for Verification of Angle Measurement Instrument (RAM) Calibration

Procedure 1

Standardization Procedure: ITD-D2

Drying Oven Standardization

Inspection Equipment Required:

1. A standardized thermometer, per Procedure 26, graduated in 1.0° C increments having a range which includes the temperature range to be checked

2. A brass thermometer well to retain heat while the oven door is open. This is essential for a constant temperature reading.

3. A clothes pin to hold the thermometer in place to enable the operator to read the scale easily from outside of the oven.

Tolerance:

Drying ovens shall be capable of maintaining a constant temperature range listed in the appropriate test methods.

Procedure:

1. Place the thermometer inside the brass well with the clothes pin attached to the thermometer. Position the thermometer on the shelf where the samples are normally dried.

2. Take the first reading at least 1 hour after closing the oven (oven should remain undisturbed).

3. Take as many readings as necessary to determine if the temperature range is within the specified tolerance (three consecutive readings, taken no less than 1/2 hour apart, within the tolerance allowed are adequate.)

4. Adjust the temperature of the oven if an observed temperature reading is outside the tolerance specified (allow at least 1/2 hr. for the temperature to stabilize between each adjustment.) If temperature is adjusted, return to step 3.

5. Record the Serial No. of the thermometer being used.

Worksheet 1

Drying Oven Temperature Standardization Record

Standardization Procedure: ITD-2 Standardization Frequency: 12 months

Identification Number:	Date Standardized:
Manufacturer:	Model No:
Serial No.:	Temperature Working Range:
Standardized Thermometer Number:	Standardization Data: ☐ As Found ☐ As Adjusted

Reading	Time1	Temp1	Time2	Temp2	Time3	Temp3
1						
2						
3						

Oven Temperature Control Setting:	
Accuracy Requirement: ± 5°C, 9°F	Within Required Range? ☐ Yes ☐ No
Temperature Range for which oven is qualified:	Disposition of Oven: ☐ Acceptable ☐ Not Acceptable

Remarks:

Standardized by:	Signature:
WAQTC NO.	
PREVIOUS STANDARDIZATION DATE:	RE- STANDARDIZATION DUE DATE:

Procedure 2

Check Procedure: ITD-D5

Mechanical Sieve Shaker Check

General Equipment:

1. Ensure shaker imparts a vertical, or lateral and vertical motion to the sieve, so as to cause particles to present different orientations to the sieving surface.

2. Lubricate shaker as specified by manufacturer.

3. Evaluate all mechanical and operational moving parts of the shaker for wear and proper operating tolerances specified by manufacturer's maintenance specifications.

4. Record the observation, deficiency and any comments.

Sieve Shaker Check

AASHTO T 27, Sections 6.3 & 8.4

Apparatus:

1. Typical sieve or screen stack used in the shaker

2. Balance readable to 0.1g

3. Timer

Sample Size

A dry aggregate sample with coarse and fine material will be used as follows:

1. For 12" round sieve shaker – use minimum of 2000 grams (+50 grams) with the maximum sieve size the 3/8" sieve.

2. For 8" round sieve shaker – use minimum of 1000 grams (+50 grams) with the maximum sieve size the ½" sieve.

3. For 14" or 16" coarse screen shaker – use minimum of 4000 grams (+50 grams) with the maximum screen size the 1" screen

Procedure:

1. Determine total sample mass and record

2. Place sample in top of sieve stack and begin shaker.

3. Shake sieve stack for a set amount of time between 5 and 10 minutes.

4. Hand-sieve each individual sieve, that has been snugly fit with a pan and cover, by holding the sieve in a slightly inclined position in one hand. Strike the side of the sieve sharply and with an upward motion against the heel of the other hand at the rate of about 150 times per minute, turn the sieve about one-sixth of a revolution at intervals of about 25 strokes.

5. Determine the mass of the material in the pan after hand-sieving for 1.0 minute.

6. Divide the mass of the material in the pan (B) by the total sample mass (A).

7. The mass in the pan but be not more than 0.5 percent (0.005) of the total sample mass. If B/A is greater than 0.005 then the time shaken is not sufficient. Restart the procedure with step 3 and shake the sieve stack for 2.0 minutes longer than the previous trail time until the tolerance of 0.005 is obtained after 1.0 minute of hand-sieving. The tolerance must be obtained without the shake time exceeding 15.0 minutes.

8. Continue to hand-sieve, record each individual sieve and calculate whether the percent is within the 0.005 tolerance.

9. Determine and record the required shake time. <u>The required shake time is the minimum amount of time to achieve the 0.005 tolerance.</u>

Worksheet 2

Mechanical Sieve Shaker Efficiency Check

Check Procedure: ITD-D-5 Check Frequency: 12 months

Date Checked:	Shaker Manufacturer:
Model No. :	Identification No. :
Standard Balance Number:	Mass of Total Sample:

Sieve Size	Sieve Ident. No.	Mass retained by mechanical sieving	Hand Sieving Mass Passing	Hand Sieving % Passing	Acceptable (Y/N)[1]
1”					
3/8”					
No. 8					

Note 1: No more than 0.5%, by mass, of the total sample shall pass any one sieve after one minute of continuous hand sieving.

Minimum mechanical shaking time required minutes	
Shaker was cleaned: ☐	Shaker was lubricated: ☐

Remarks:	
Checked By:	Signature:
WAQTC NO.	
PREVIOUS CHECK DATE:	RE- CHECK DUE DATE:

.

Procedure 3

Check Procedure: ITD-D3

Sand Equivalent Apparatus Check

Inspection Equipment Required:

1. A Timer readable to 1 sec.
2. A Ruler of at least 300 mm in length, reading in mm.
3. A balance capable of reading to 1 g.
4. A number 60 drill bit.
5. A caliper readable to 0.01mm.

Tolerance:

Shaker shall be capable of maintaining constant range listed in the appropriate test methods.

Procedure:

1. Check and record the timer setting at 45 Sec.
2. Measure and record the throw of the shaker arm.
3. Measure and record the number of cycles for 45 seconds.
4. Measure and record the capacity of the tinned box.
5. Verify the wide-mouth funnel to insure it is approximately 100 mm in diameter
6. Weigh and record the weight of the foot.
7. Measure and record the diameter of the foot.
8. Measure and record the height from the top of the working surface to the top of the shelf where solution sits.
9. Measure and record the length, diameter of the irrigator tube.
10. Measure and record that the openings in the end of the irrigator tube are within tolerance.
11. Record Checked By.
12. Record the date of inspection
13. Record any comments

Worksheet 3

Sand Equivalent Test Apparatus Check Record

Apparatus Requirements: ITD-D3 Check Frequency: 12 months

Identification No.:	Date Checked:
Calibration Balance Number:	

Siphon assembly of proper material and configuration:	☐ Satisfactory	☐ Unsatisfactory
Graduated cylinder:(1.5" dia., 0 to 15" marks +/- 0.3")	☐ Satisfactory	☐ Unsatisfactory
Weighted foot assembly meets proper dimensional requirements: 256.5 mm from bottom of foot to top of ring and 1" (25.4mm) diameter	☐ Satisfactory	☐ Unsatisfactory
Weighted foot assembly: g (ASTM-D2419 range: 995 to 1005g)	☐ Satisfactory	☐ Unsatisfactory
Electronic SE Shaker Ident. No. :	8 inch stroke ☐ Yes ☐ No	
Note: <u>If only manual shaking then tester must be qualified.</u>	130 to 134 strokes per 45 seconds ☐ Yes ☐ No	
Solution Temperature: 72º F ± 5º	☐ Yes	☐ No
Shelf Height: 36" ± 1"	☐ Yes	☐ No
Tin: Approx. 2.25" in Diameter and holds 85ml ± 5 ml	☐ Yes	☐ No
Stainless Steel Irrigation Tube: 510mm long, 6.4mm (1/4") outside diameter	☐ Yes	☐ No
Irrigation Holes: Two #60 drill bit size on each side at end	☐ Yes	☐ No

Disposition of Sand Equivalent Test Apparatus:	☐ Acceptable ☐ Not Acceptable

Remarks:	
Checked By:	Signature:
WAQTC NO.	
PREVIOUS CHECK DATE:	RE- CHECK DUE DATE:

Procedure 4

Check Procedure: ITD-D11

Wire Cloth Sieve Check

AASHTO M 92 (ASTM E11)

Procedure for Sieves No. 6 and finer:

1. Record the sieve identification number.

2. Inspect the general condition of the sieve frame as specified in AASHTO M 92 (ASTM E11) 6.3 Test Sieve Frame

3. AASHTO M 92 ANNEX A1.1.1:

    a. View the sieve cloth against a uniformly illuminated background. If obvious deviations, for example weaving defects, creases, wrinkles foreign matter in the cloth, are found, the wire cloth is unacceptable

4. AASHTO M 92 (ASTM E11) ANNEX, A1.1.2:

    a. Carefully and methodically examine the appearance of all the openings, in order to detect oversize openings, sequences of large openings and local irregularities. If any opening is found tobe oversize by more than tolerance X in Column 5 of Table 1, the sieve is unacceptable.

5. Record Checked By.

6. Record Date checked.

7. Record any comments.

Worksheet 4

Wire Cloth Sieves Check Procedure

Check Procedure: ITD-D-11 Check Frequency: 12 months

Identification No.:	Date:
Manufacturer:	Sieve size:

General condition of sieve frame:	☐ Acceptable ☐ Unacceptable
General condition of sieve cloth, Annex A1.1.1 Observation of deviations, such as weaving defects, creases, wrinkles	☐ Acceptable ☐ Unacceptable
Sieve opening appearance, Annex A1.1.2 Observation of oversized openings must be less than Column 6 (Table 1, Column 1 + Column 5)	☐ Acceptable ☐ Unacceptable

Remarks:	
Checked By:	Signature:
WAQTC NO.	
PREVIOUS CHECK DATE:	RE-CHECK DUE DATE:

Procedure 5

Check Procedure: ITD-D11

Sieve Check

Inspection Equipment Required:

1. A caliper readable to 0.01 mm (for use with Sieve No. 4 and coarser).

Tolerance:

Sieves shall meet the physical requirements specified in AASHTO M 92 (ASTM E11)

Procedure for Sieves No. 4 and coarser:

1. Record the sieve identification number
2. Inspect the general condition of the sieve frame as specified in AASHTO M 92 (ASTM E11) 6.3 Test Sieve Frame and Table 2.
3. Measure the openings in the sieve as per AASHTO M 92 (ASTM E11) ANNEX A1.1.2 and inspect for maximum oversize openings per tolerance X given in Table 1, Column 6.
4. Measure the openings in the sieve as per AASHTO M 92 (ASTM E11) ANNEX A1.1.3 and determine the maximum allowable tolerance of average opening size, Table 1 Column 1 ± Column 4
5. Determine and record if the sieve meets the tolerances of AASHTO M 92 (ASTM E 11) as shownon the worksheet at a, b and c.
6. Record Checked By.
7. Record Date checked.
8. Record any comments.

Worksheet 5

Sieve Measurements

Check Procedure ITD D11

Identification Number:	Check Date:	Nominal sieve opening, w =#4 (4.75 mm)

Opening #	Opening Size X Vertical	Opening #	Opening Size Y Horizontal
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	
9		9	
10		10	
11		11	
12		12	
13		13	
14		14	
15		15	
Average X		Average Y	

a = General Condition of Sieve Frame (Section 6.3 and Table 2)	Met ☐ Not Met ☐
Max. Individual sieve Opening, b = 5.16 mm (table 1, column 6),	Met ☐ Not Met ☐
Maximum allowable tolerance of average openings, c = 4.60 to 4.90 mm (Table 1,column 1 + or - column 4)	Met ☐ Not Met ☐

From Table 1 in AASHTO M 92 (ASTM E11):

Verify general condition of sieve frame a; maximum opening size does not exceed b; and the average of the sieve openings meets the requirements of c.

Sieve Disposition: ☐ Acceptable ☐ Unacceptable	
Remarks:	
Checked By:	Signature:
WAQTC NO.	
PREVIOUS CHECK DATE:	RE-CHECK DUE DATE:

Worksheet 5

Sieve Measurements

Check Procedure ITD D11

Identification Number:	Check Date:	Nominal sieve opening, w =1/4 in. (6.3 mm)

Opening #	Opening Size X Vertical	Opening #	Opening Size Y Horizontal
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	
9		9	
10		10	
11		11	
12		12	
13		13	
14		14	
15		15	
Average X		Average Y	

a = General Condition of Sieve Frame (Section 6.3 and Table 2)	Met ☐ Not Met ☐
Max. Individual sieve Opening, b = 6.81 mm (table 1, column 6),	Met ☐ Not Met ☐
Maximum allowable tolerance of average openings, c = 6.10 to 6.50 mm (Table 1,column 1 + or - column 4)	Met ☐ Not Met ☐

From Table 1 in AASHTO M 92 (ASTM E11):

Verify general condition of sieve frame a; maximum opening size does not exceed b; and the average of the sieve openings meets the requirements of c.

Sieve Disposition: ☐ Acceptable ☐ Unacceptable	
Remarks:	
Checked By:	Signature:
WAQTC NO.	
PREVIOUS CHECK DATE:	RE-CHECK DUE DATE:

Worksheet 5

Sieve Measurements

Check Procedure ITD D11

Identification Number:	Check Date:	Nominal sieve opening, w =3/8 in. (9.5 mm)

Opening #	Opening Size X Vertical	Opening #	Opening Size Y Horizontal
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	
9		9	
10		10	
11		11	
12		12	
13		13	
14		14	
15		15	
Average X		Average Y	

a = General Condition of Sieve Frame (Section 6.3 and Table 2)	Met ☐ Not Met ☐
Max. Individual sieve Opening, b = 10.18 mm (table 1, column 6),	Met ☐ Not Met ☐
Maximum allowable tolerance of average openings, c 9.21 to 9.80 mm (Table 1,column 1 + or - column 4)	Met ☐ Not Met ☐

From Table 1 in AASHTO M 92 (ASTM E11):

Verify general condition of sieve frame a; maximum opening size does not exceed b; and the average of the sieve openings meets the requirements of c.

Sieve Disposition: ☐ Acceptable ☐ Unacceptable	
Remarks:	
Checked By:	Signature:
WAQTC NO.	
PREVIOUS CHECK DATE:	RE-CHECK DUE DATE:

Worksheet 5

Sieve Measurements

Check Procedure ITD D11

Identification Number:	Check Date:	Nominal sieve opening, w =1/2 in. (12.5 mm)

Opening #	Opening Size X Vertical	Opening #	Opening Size Y Horizontal
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	
9		9	
10		10	
11		11	
12		12	
13		13	
14		14	
15		15	
Average X		Average Y	

a = General Condition of Sieve Frame (Section 6.3 and Table 2)	Met ☐ Not Met ☐
Max. Individual sieve Opening, b = 13.33 mm (table 1, column 6),	Met ☐ Not Met ☐
Maximum allowable tolerance of average openings, c = 12.12 to 12.89 mm (Table 1,column 1 + or - column 4)	Met ☐ Not Met ☐

From Table 1 in AASHTO M 92 (ASTM E11):

Verify general condition of sieve frame a; maximum opening size does not exceed b; and the average of the sieve openings meets the requirements of c.

Sieve Disposition: ☐ Acceptable ☐ Unacceptable	
Remarks:	
Checked By:	Signature:
WAQTC NO.	
PREVIOUS CHECK DATE:	RE-CHECK DUE DATE:

Worksheet 5

Sieve Measurements

Check Procedure ITD D11

Identification Number:	Check Date:	Nominal sieve opening, w =5/8 in. (16.0 mm)

Opening #	Opening Size X Vertical	Opening #	Opening Size Y Horizontal
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	
9		9	
10		10	
11		11	
12		12	
13		13	
14		14	
15		15	
Average X		Average Y	

a = General Condition of Sieve Frame (Section 6.3 and Table 2)	Met ☐ Not Met ☐
Max. Individual sieve Opening, b = 16.99 mm (table 1, column 6),	Met ☐ Not Met ☐
Maximum allowable tolerance of average openings, c = 15.51 to 16.49 mm (Table 1,column 1 + or - column 4)	Met ☐ Not Met ☐

From Table 1 in AASHTO M 92 (ASTM E11):

Verify general condition of sieve frame a; maximum opening size does not exceed b; and the average of the sieve openings meets the requirements of c.

Sieve Disposition: ☐ Acceptable ☐ Unacceptable	
Remarks:	
Checked By:	Signature:
WAQTC NO.	
PREVIOUS CHECK DATE:	RE-CHECK DUE DATE:

Worksheet 5

Sieve Measurements

Check Procedure ITD D11

Identification Number:	Check Date:	Nominal sieve opening, w =3/4 in. (19.0 mm)

Opening #	Opening Size X Vertical	Opening #	Opening Size Y Horizontal
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	
9		9	
10		10	
11		11	
12		12	
13		13	
14		14	
15		15	
Average X		Average Y	

a = General Condition of Sieve Frame (Section 6.3 and Table 2)	Met ☐ Not Met ☐
Max. Individual sieve Opening, b = 20.13 mm (table 1, column 6),	Met ☐ Not Met ☐
Maximum allowable tolerance of average openings, c = 18.25 to 19.75 mm (Table 1,column 1 + or - column 4)	Met ☐ Not Met ☐

From Table 1 in AASHTO M 92 (ASTM E11):

Verify general condition of sieve frame a; maximum opening size does not exceed b; and the average of the sieve openings meets the requirements of c.

Sieve Disposition: ☐ Acceptable ☐ Unacceptable	
Remarks:	
Checked By:	Signature:
WAQTC NO.	
PREVIOUS CHECK DATE:	RE-CHECK DUE DATE:

Worksheet 5

Sieve Measurements

Check Procedure ITD D11

Identification Number:	Check Date:	Nominal sieve opening, w =1" in. (25.0 mm)

Opening #	Opening Size X Vertical	Opening #	Opening Size Y Horizontal
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	
9		9	
10		10	
11		11	
12		12	
13		13	
14		14	
15		15	
Average X		Average Y	

a = General Condition of Sieve Frame (Section 6.3 and Table 2)	Met ☐ Not Met ☐
Max. Individual sieve Opening, b = 26.38 mm (table 1, column 6),	Met ☐ Not Met ☐
Maximum allowable tolerance of average openings, c = 24.24 to 25.76 mm (Table 1,column 1 + or - column 4)	Met ☐ Not Met ☐

From Table 1 in AASHTO M 2 (ASTM E11):

Verify general condition of sieve frame a; maximum opening size does not exceed b; and the average of the sieve openings meets the requirements of c.

Sieve Disposition: ☐ Acceptable ☐ Unacceptable	
Remarks:	
Checked By:	Signature:
WAQTC NO.	
PREVIOUS CHECK DATE:	RE-CHECK DUE DATE:

Worksheet 5

Sieve Measurements

Check Procedure ITD D11

Identification Number:	Check Date:	Nominal sieve opening, w =1-1/2 in. (37.5 mm)

Opening #	Opening Size X Vertical	Opening #	Opening Size Y Horizontal
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	
9		9	
10		10	
11		11	
12		12	
13		13	
14		14	
15		15	
Average X		Average Y	

a = General Condition of Sieve Frame (Section 6.3 and Table 2)	Met ☐ Not Met ☐
Max. Individual sieve Opening, b = 39.35 mm (table 1, column 6),	Met ☐ Not Met ☐
Maximum allowable tolerance of average openings, c = 36.37 to 38.63 mm (Table 1,column 1 + or - column 4)	Met ☐ Not Met ☐

From Table 1 in AASHTO M 92 (ASTM E11):

Verify general condition of sieve frame a; maximum opening size does not exceed b; and the average of the sieve openings meets the requirements of c.

Sieve Disposition: ☐ Acceptable ☐ Unacceptable	
Remarks:	
Checked By:	Signature:
WAQTC NO.	
PREVIOUS CHECK DATE:	RE-CHECK DUE DATE:

Worksheet 5

Sieve Measurements

Check Procedure ITD D11

Identification Number:	Check Date:	Nominal sieve opening, w =2" in. (50.0 mm)

Opening #	Opening Size X Vertical	Opening #	Opening Size Y Horizontal
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	
9		9	
10		10	
11		11	
12		12	
13		13	
14		14	
15		15	
Average X		Average Y	

a = General Condition of Sieve Frame (Section 6.3 and Table 2)	Met ☐ Not Met ☐
Max. Individual sieve Opening, b = 52.29 mm (table 1, column 6),	Met ☐ Not Met ☐
Maximum allowable tolerance of average openings, c = 48.51 to 51.49 mm (Table 1,column 1 + or - column 4)	Met ☐ Not Met ☐

From Table 1 in AASHTO M 92 (ASTM E11):

Verify general condition of sieve frame a; maximum opening size does not exceed b; and the average of the sieve openings meets the requirements of c.

Sieve Disposition: ☐ Acceptable ☐ Unacceptable	
Remarks:	
Checked By:	Signature:
WAQTC NO.	
PREVIOUS CHECK DATE:	RE-CHECK DUE DATE:

Worksheet 5

Sieve Measurements

Check Procedure ITD D11

Identification Number:	Check Date:	Nominal sieve opening, w =3" in. (75.0 mm)

Opening #	Opening Size X Vertical	Opening #	Opening Size Y Horizontal
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	
9		9	
10		10	
11		11	
12		12	
13		13	
14		14	
15		15	
Average X		Average Y	

a = General Condition of Sieve Frame (Section 6.3 and Table 2)	Met ☐ Not Met ☐
Max. Individual sieve Opening, b = 78.09 mm (table 1, column 6),	Met ☐ Not Met ☐
Maximum allowable tolerance of average openings, c = 72.78 to 77.22 mm (Table 1,column 1 + or - column 4)	Met ☐ Not Met ☐

From Table 1 in AASHTO M 92 (ASTM E11):

Verify general condition of sieve frame a; maximum opening size does not exceed b; and the average of the sieve openings meets the requirements of c.

Sieve Disposition: ☐ Acceptable ☐ Unacceptable	
Remarks:	
Checked By:	Signature:
WAQTC NO.	
PREVIOUS CHECK DATE:	RE-CHECK DUE DATE:

Procedure 6

Procedure: ITD-D7

Splitter Check

Inspection Equipment Required:

1. A steel rule readable in mm

Tolerance:

As outlined in AASHTO R 76

Procedure:

1. Select the serial number of the equipment to be checked.
2. Record the number of chutes
3. Measure and record the width of the chutes.
4. Is the dump pan equal to or slightly less than the width of the chutes assembly?
5. Record the date checked.
6. Record checked by.
7. Record any comment

Worksheet 6

Sample Splitter Check (Riffle)

Check Procedure: ITD-D7 (Ref.: AASHTO R 76) Check Frequency: 12 months

Identification No.:	Calibration Date:
Manufacturer:	Model No.:
Calibration Standard Used:	Ruler Number:

Opening #	Opening Size	Opening #	Opening Size
1		13	
2		14	
3		15	
4		16	
5		17	
6		18	
7		19	
8		20	
9		21	
10		22	
11		23	
12		24	

Is Dump Pan Equal To or Slightly Less Than Width of Chute Assembly?	☐ Yes ☐ No
Splitter Disposition:	☐ Acceptable ☐ Unacceptable

Remarks:	
Checked By:	Signature:
WAQTC NO.	
PREVIOUS CHECK DATE:	RE- CHECK DUE DATE:

Procedure 7

Check Procedure: ITD-D9

Timers Check

Inspection Equipment Required:

Timer, readable to 1.0 sec., having a verified accuracy within the tolerance listed in the specified test procedure.

Tolerance:

Timers shall meet the accuracy requirements specified in the applicable test methods.

Procedure:

1. Choose the timer to be checked.
2. Enter the serial number of the timer used to check with.
3. Start both timers simultaneously.
4. Allow both timers to run at least for 15 min. then stop both timers simultaneously.
5. Record the time of the timer to be checked to the nearest 1.0 sec.
6. Record the time of the timer being used for checking the timer to the nearest 1.0 sec,
7. Record the percent of accuracy of the two timers.

$$\%\ Accuracy = \left[\frac{(A - B)}{B}\right] \times 100$$

Where:

A = Reading on lab timer (Sec.)

B = Reading on standard timer (Sec.)

Worksheet 7

Timer Check

Check Procedure: ITD-D9 Check Frequency: 12 months

Identification No.:	Check Date:
Manufacturer:	Model:
Serial No.:	Standardized Standard Timer Identification No:

Start both lab timer and standard timer at the same time, allow to run for at least 15 minutes, then stop both timers simultaneously.

Record time to nearest second on Lab Timer: = A (seconds)
Record time to nearest second on Standard Timer: = B (seconds)
$\%\ Accuracy = \left[\frac{(A-B)}{B}\right] \times 100$
% Error =

Remarks:	
Checked By:	Signature:
WAQTC NO.	
PREVIOUS CHECK DATE:	RE- CHECK DUE DATE:

Procedure 8

Check Procedure: ITD-D43

STRAIGHT EDGE CHECK

AASHTO T 99 Section 3.6

Inspection Equipment Required

1. Tape measure readable to 1/16 "
2. Calipers readable to 0.0001"

Tolerance:

The straight edge shall be made of hardened steel at least 250 mm long (10"). It shall have one beveled edge planed to a tolerance of 0.250 mm per 250 mm (0.01" per 10"). The straight edge should not flex enough to cause the cutting edge to cut a concave surface on the sample.

Procedure:

1. Measure the straight edge with a tape measure.
2. Measure the beveled edge with calipers, along the entire length of the straight edge.
3. Check the straight edge for flex by placing it on an empty mold and apply pressure in the center of the straight edge.
4. Check planeness of the beveled edge within 0.005” with certified straight-edge.

Worksheet 8

Straightedge Check Record

Check Procedure: ITD-D-43 Check Frequency: 12 months

Straightedge Identification No.:	Date Checked:
Standard Used: Caliper Number:	

DIMENSIONAL DATA:

Length: Greater than 10”?	☐ Yes	☐ No
Thickness: if greater than 1/8", is scraping edge beveled?	☐ Yes	☐ No
Planeness of edge within 0.005”?	☐ Yes	☐ No
Certified Straightedge used to check planeness	Ident. No.	
Is straight edge non-flexible?	☐ Yes	☐ No

Disposition of Straightedge:	☐ Acceptable	☐ Not Acceptable

Remarks:	
Checked By:	Signature:
WAQTC NO.	
PREVIOUS CHECK DATE:	RE- CHECK DUE DATE:

Procedure 9

Standardization Procedure: ITD-NCAT1

Ignition Furnace Equipment Standardization Procedure

Standardization Frequency: Lift Test – weekly when in use

Internal Balance – 30 days and following furnace transport

Equipment: Ignition Furnace

** NOTE: These procedures were developed around the Thermolyne (NCAT) ignition furnace.

Other manufactures furnaces may be slightly different.

Standard References: AASHTO T 308

Manufacturer's Operation and Maintenance Manual

Purpose:

- This method provides instruction on:
- checking the airflow rates through the tester and cleaning the filtration system when needed.
- how to lubricate the blower motor and other routine maintenance and checks.
- transportation in a mobile laboratory.
- field inspection and verification of internal balance verification.
- These procedures are in addition to the required annual calibration of the ignition furnaces by a commercial laboratory.

Inspection Equipment Required:

1. Vacuum Cleaner with brush
2. Protective Gloves
3. Synthetic lubricant such as Anderoll 465
4. Screwdriver
5. Calibrated weight set consisting of two 4,000 gram N.I.S.T. traceable Class 3 weights. A copy of the N.I.S.T. traceable weight certificates must be retained with the verification weights.

Tolerances:

Lift on the scale should be between –3.5 and -10 grams.

Internal balance verification should be within ±0.05% of applied weight.

Procedure:

THE FILTRATION SYSTEM MUST BE CLEANED.

BLOWER MOTOR BEARINGS NEED TO BE OILED YEARLY.

(Mixes containing latex, crumb rubber, or polymer modifiers generate more smoke and soot and burning large samples also produce more smoke/soot.)

Checking Airflow Rates:

1. Ignition Furnace must be COLD when checking.
2. Turn the Furnace on using the switch on the control panel.
3. Allow the scale to stabilize (about 20 seconds).
4. Press the START button on the keypad.
5. Watch the scale indicator display once the blower starts. The numbers should be in the range of –3.5 to -10 grams. If the reading is closer to -10, your furnace is getting the correct amount of air. If the reading is at –3.5 grams or lower, the filtration system needs to be cleaned.

Cleaning The Filtration System:

1. Turn off power to the Furnace.
2. Disconnect the exhaust hose from the Furnace and remove the outer metal cap.
3. Remove the four screws holding the blower and remove the blower assembly. (TIP: Chances are pretty good that there will be an accumulation of soot up there, so have the vacuum cleaner handy!) Vacuum out the vanes in the blower.
4. Remove the eight screws holding down the stainless steel plenum chamber and lift chamber off the top of the Furnace. Vacuum everything in sight!
5. Remove the three baffle plates (2 screws each), and vacuum them. Also remove the five ceramic tubes and clean them with a brush/vacuum cleaner. Replace when clean.
6. Reassemble upper filtration system and run scale lift diagnosis as above.
7. The exhaust stack also should be cleaned at this time.

(The entire filter cleaning operation should appropriately thirty minutes.)

Lubricating The Blower Motor:

There are two rubber plugs on the motor with small holes in the center of each plug. Remove the plugs and insert about 10-20 drops of synthetic lubricant such as ANDEROLL 465 in each bearing. DO NOT OVER-OIL AND DO NOT USE PETROLEUM BASED PRODUCTS.

Other Items:

1. Check that the following furnace components are operating in accordance with the manufacturer's written directions.
2. Pay particular attention to the operation of the door locking system and that the lock device and limit switch is properly adjusted.
3. Door seal: check for condition of seal and air tightness.
4. Filter gaskets: check for condition and proper fit.
5. Heating elements.

Weekly Lifts Checks:

A copy of the Ignition Furnace Equipment Verification Record shall be available for each furnace showing the weekly lift checks. The lift is to be checked by the operator every fifth day of operation preferably on a Monday morning prior to starting the furnace. Period when the unit is not in operation should be noted on the record.

Transporting Ignition Furnaces Fixed In A Mobile Laboratory:

Before a mobile laboratory containing an ignition furnace is moved the furnace must be secured. The furnace must be firmly attached to the counter top or placed on the floor of the mobile laboratory. The internal balance must be secured for transportation. See the manufactures instructions. For the NCAT furnaces with a Setra or Ohaus balance at a minimum the carbide hearth tray and the support tubes will be removed and safely stored before the furnace and /or the mobile laboratory is moved.

Balance Inspection:

If a mobile laboratory or a fixed site is being used for housing an ignition furnace and the furnace has been transported to that site the balance must be inspected. The support tubes and carbide hearth tray must be placed back into the furnace.

Open the furnace door. Insert the four support tubes through the tube ports located in the bottom of the furnace chamber. The tubes should seat on the appropriate pins on the balance plate. The support tubes should not be in contact with the sides of the tube ports. If any of the support tubes will not seat on the appropriate pins or are rubbing on the side of the tube port the balance has moved during transport and must be adjusted. See manufactures instructions.

Once the support tubes are in place, place the carbide hearth tray on the tubes. Center the hearth tray on the four tubes, equal distance from side to side.

Internal Balance Verification of calibration:

Verification of the internal balance calibration is required every 30 days when the furnace is in use and after any transport or movement of the ignition furnace. This is in addition to the required annual balance calibration by a commercial calibration company.

A copy of the Ignition Furnace Equipment Verification Record shall be available for each furnace showing internal balance verifications.

Identify the type of internal balance in the ignition furnace (typically Setra or Ohaus).

1. The furnace must be COLD before verifying its internal scale; however the balance must be on for at least 20 minutes prior to verification. This can be done by leaving the chamber door open with the furnace on.
2. Insert a paper or cloth for the weights to set on, re-zero the balance.
3. Place the 4000 gram weight as close to the center of the silicon carbide hearth tray as possible.
4. Record the reading and verify the reading is within ± 0.05% (2.0 grams).
5. Place the other 4000 gram weight on the scale with both weights as close to the center of the silicon carbide hearth tray as possible.
6. Record the reading and verify the reading is within ± 0.05% (4.0 grams).

If both readings are within the limits, the internal balance is within specifications. If either reading is not within the limits, then the internal balance cannot be used until it is serviced by a certified commercial company.

External Balance Verification of calibration:

Verification of the external balance is required at the same time with the internal balance verification.

1. Place a paper or cloth for the weights to set on, re-zero the balance. Place the 4000 gram weight as close to the center of the silicon carbide hearth tray as possible.
2. Record the reading and verify the reading is within ± 0.05% (2.0 grams).
3. Place the other 4,000 gram weight on the scale with both weights as close to the center of the silicon carbide hearth tray as possible.
4. Record the reading and verify the reading is within ± 0.05% (4.0 grams).

If both readings are within the limits, the external balance is within specifications. If either reading is not within the limits, then an external balance that meets the requirements must be provided.

Worksheet 9

Ignition Furnace Equipment Standardization Record

Standardization Procedure: ITD-NCAT1 Standardization Frequency: As noted

Ignition Furnace Ident No.	Furnace Manufacturer:	Internal Balance Manufacturer:	External Balance Ident No.

Verification		Air Flow Rate Range: -3.5g to -10g	Cleaning? Yes or No	Internal Balance		Disposition of Internal Balance		External Balance		Disposition	
Date	By			4,000 ± 2.0 g	8,000 ± 4.0 g	Within Specs	Out of Specs (use external balance)	4,000 ± 2.0 g	8,000 ± 4.0 g	Within Specs	Out of Specs
			☐Y ☐N								
			☐Y ☐N								
			☐Y ☐N								
			☐Y ☐N								
			☐Y ☐N								
			☐Y ☐N								
			☐Y ☐N								
			☐Y ☐N								
			☐Y ☐N								
			☐Y ☐N								
			☐Y ☐N								

Procedure 10

Procedure No. ITD-D21

Procedure For Standardizing Maximum Specific Gravity Bowls

AASHTO T 209, ASTM D240

Standardization Equipment Required:

1. Balance with "below the scale" weighing for gravity baths, capable of weighing to nearest 0.1g.
2. Thermometer capable of reading to nearest 0.1°F.

Tolerance:

Bowl mass recorded to nearest 0.1g.

Procedure:

1. Fill gravity bath and wait until water level overflow has stopped.
2. Bring water temperature to 25 ± 0.1°C.
3. Determine the mass of the bowl dry in air and record, as mass in air.
4. Suspend bowl in water to a depth sufficient to cover the entire bowl.
5. When all overflow water has stopped record the weight of the bowl as weight in water.
6. Perform these determinations at least twice with the difference between any two determinations not exceeding 0.1 grams.

Worksheet 10

Maximum Theoretical Specific Gravity Standardization Record

Standardization Reference: ITD D21 Standardization Frequency: 12 months

Date of Standardization:

Vacuum Container:		
Type	Standardization Date:	Ident No.:
Calibration / Standardization Standards:	Balance Ident Number	
	Thermometer Ident Number:	
	Residual Pressure Manometer Make: Model No:	

Vacuum Container Standardization Data:

Bowl No.	Water Temperature, C°	Dry Reading Mass of Bowl	Immersed Reading Weight of Bowl

Vacuum Pump System

Measured residual pressure (25-30mm of Hg or less)- mm Hg

Satisfactory - ☐ Yes ☐ No

Remarks:	
Standardized by:	Signature:
WAQTC NO.	
PREVIOUS STANDARDIZATION DATE:	RE-STANDARDIZATION DUE DATE:

Procedure 11

Procedure No.: ITD-D20

Plungers, Followers, Shims, Supports And Round Rod Check

Equipment Checked:

Plungers, followers, shims, supports, round rod. (AASHTO T 167, Idaho IT-8).

Purpose:

To check the critical dimensions of Compressive Strength and Hveem. plungers, followers, shims, supports and round rod.

Inspection Equipment Required:

1. Micrometer readable to 0.01 mm.

Tolerance:

The critical dimensions shall meet the applicable method(s).

Procedure:

1. Measure and record the outside diameter to nearest 0.01 mm.
2. Rotate 90 degrees (1/4 turn) and repeat step 1.
3. Where height measurement is required repeat steps 1 and 2.

Worksheet 11

Check Record for Plungers, Followers, Supports, Shims and Rods

Check Procedure: ITD-D20 Check Frequency: 12 Months

Date of Check: Micrometer No.:

Item	Measurements		Within Tolerances	Action Taken
Leveling Load	Diameter, mm	Height, mm	Diameter 101.09 to 101.31 mm	
Follower: Height 140.0 mm			Yes☐ No☐	
Follower: Height 38.1 mm			Yes☐ No☐	
Stabilometer	Diameter, mm	Height, mm	Diameter 101.47 to 101.73 mm Height 140.0 mm	
Calibration Follower			Yes☐ No☐	
Immersion Compression	Diameter, in.	Height, in.	Followers, Diameter 4.000 in. Plungers, Height 2 +/- 1/8 in. Supports 25.4 mm	
Follower #1			Yes☐ No☐	
Follower #2			Yes☐ No☐	
Plunger #1			Yes☐ No☐	
Plunger #2			Yes☐ No☐	
Support #1			Yes☐ No☐	
Support #2			Yes☐ No☐	
Miscellaneous	**Diameter, mm**	**Length, mm**	Rod Diameter 9.5 mm Rod Length 406.0 mm Shims 6.4 x 19 X 64 mm	
Round Nose Rod			Yes☐ No☐	
Steel Shims, Hveem Stability			Yes☐ No☐	
			Yes☐ No☐	

Remarks:	
Checked by:	Signature:
WAQTC NO.	
PREVIOUS CHECK DATE:	RE- CHECK DUE DATE:

Procedure 12

Procedure No. ITD D-18

Vacuum Systems Standardization

Equipment Checked:

Vacuum Systems (AASHTO T 100, T 209) (ASTM D854, D2041)

Inspection Equipment Required:

1. Standardized absolute pressure gauge.
2. Water vapor trap.
3. Hoses, connectors, tools etc.

Tolerance:

Vacuum systems shall be capable of applying and maintaining the vacuum specified in the applicable test method.

Procedure:

1. Connect the standardized vacuum gauge to the system with the trap in-line between the system and the standardized gauge.
2. Make sure all connections are air tight.
3. Apply a vacuum to the number of vessels normally used in testing. Read and record the pressure indicated on the calibrated vacuum gauge.

Worksheet 12

Vacuum System Standardization Record

Standardization Procedure: ITD-D18 Standardization Frequency: 12 months

Date of Standardization:	
Standardization equipment:	Serial No.
Reading: Hg	psig
Action recommended: ☐None ☐ Repair ☐Replace	

Remarks:	
Standardized by:	Signature:
WAQTC NO.	
PREVIOUS STANDARDIZATION DATE:	RE- STANDARDIZATION DUE DATE:

Procedure 13

Procedure: ITD-D19

Immersion-Compression, or R-Value Specimen Molds Check

AASHTO T 167, Idaho IT-8

Inspection Equipment Required:

Calipers capable of measuring the inside diameter and readable to 0.01mm.

Tolerance:

The diameter of the molds checked must meet the dimensional tolerances specified in the test methods referenced above.

Procedure:

1. Measure and record the inside diameter of the mold to the nearest 0.01mm. Rotate the mold 90 degrees (1/4 turn) and measure and record the inside diameter again.

2. Turn the mold over and repeat step 1.

Worksheet 13

Immersion / Compression Molds

(Four inch molds)

Check Procedure: ITD-D19 Check Frequency: 12 months

Date of Check:

Mold No.	Inside Diameter Reading Top		Inside Diameter Reading Bottom		Acceptable
	Reading No. 1	Reading No. 2	Reading No. 1	Reading No. 2	
					Yes☐ No☐
					Yes☐ No☐
					Yes☐ No☐
					Yes☐ No☐
					Yes☐ No☐
					Yes☐ No☐
					Yes☐ No☐
					Yes☐ No☐
					Yes☐ No☐
					Yes☐ No☐
					Yes☐ No☐
					Yes☐ No☐
					Yes☐ No☐
					Yes☐ No☐
					Yes☐ No☐

Tolerance: 101.60 mm to 101.73 mm Maximum Height

Remarks:	
Checked by:	Signature:
WAQTC NO.	
PREVIOUS CHECK DATE:	RE-CHECK DUE DATE:

Worksheet 13

Soil (R-Value) Molds

Check Procedure: ITD-D19 Check Frequency: 12 months

Date of Check:

Mold No.	Inside Diameter Reading Top		Inside Diameter Reading Bottom		Action
	Reading No. 1	Reading No. 2	Reading No. 1	Reading No. 2	

Remarks:	
Checked by:	Signature:
WAQTC NO.	
PREVIOUS CHECK DATE:	RE-CHECK DUE DATE:

Procedure 14

Procedure: IT-15 ITD-B26

Saybolt Viscometers Standardization

Inspection Equipment Required:

1. Oil standard, minimum efflux time of 90 seconds.
2. Bath maintained at 50°C. ± 0.05°C. (122°F. ± 0.10°F.)
3. Thermometer, Type ASTM 19C
4. Timer

Tolerance:

Tolerances can be found in AASHTO T 72 Section 9.4

Procedure:

1. Establish and control the bath temperature at the selected test temperature of 50°C. ± 0.05°C. (122°F. ± 0.10°F.)
2. Insert a cork stopper into the air chamber at the bottom of the viscometer a small chain or cord may be attached to the cork to facilitate rapid removal. The cork shall fit tightly enough to prevent the escape of air, as evidenced by the absence of oil on the cork when it is withdrawn later as described.
3. Stir the sample in the viscometer with the appropriate viscosity thermometer equipped with the thermometer support (T 72 Fig.3). Use a circular motion at 30 to 50 rpm in a horizontal plane.
4. When the sample temperature remains constant within 0.05°C. (0.100°F.) of the test temperature during one minute of continuous stirring, remove the thermometer.
5. Immediately place the tip of the withdrawal tube in the gallery at one point, and apply suction to remove oil until its level in the gallery is below the overflow rim with the withdrawal tube.
6. Check to be sure that the receiving flask is in proper position: then snap the cork from the viscometer and start the timer at the same instant.
7. Stop the timer the instant the bottom of the oil meniscus reaches the graduation mark on the receiving flask.
8. Record the efflux time in seconds to the nearest 0.1 second.
9. The certified Saybolt viscosity of the standard shall equal the measured efflux time at 50°C. (122°F). If the efflux time differs from the certified value by more than 0.2%, calculate a correction factor, F, for the viscometer as follows:

$$F = \frac{V}{t}$$

Where:

V = certified Saybolt viscosity of the standard.
t = measured efflux time at 50°C. (122°F.)

Worksheet 14

Saybolt Viscometer Standardization Record

Standardization Procedure: ITD-B26 Calibration Frequency: 36 months

Saybolt Viscometer Ident No. Serial No.:		Standardization Date:
Standardization equipment and serial numbers		
19°C (122°F.) Thermometer:	Standard Type:	Standardization Temperature
Lot #:	Expiration date:	Viscosity. Of Standard At Standardization Temperature:

Orifice No.	Reading #1	Reading #2	Reading #3	Average	Date Of Replacement	New Constants

Remarks:	
Standardized by:	Signature:
WAQTC NO.	
PREVIOUS STANDARDIZATION DATE:	RE-STANDARDIZATION DUE DATE:

Procedure 15

Procedure: ITD-B24

Asphalt Constant Temperature Baths, Water or Oil Calibration

Inspection Equipment Required:

1. A standardized thermometer that reads to 0.1°F. (0.06°C.)

Tolerance: Constant temperature baths shall be maintained at:

1. Penetration Bath (Water) 77°F. (25°C.) ± 0.2°F. (0.1°C.)
2. Absolute Viscosity Bath (Oil) 140°F. (60°C.) ± 0.05°F. (0.03°C.)
3. 140°F. Kinematic Bath (Oil) 140°F. (60°C.) ±0.10°F. (0.06°C.)
4. 275°F. Kinematic Bath (OiI) 275°F. (135°C.) ± 0.10°F. (0.06°C.)
5. Saybolt Furol Viscosity Bath (Oil) 77°F. (25°C.) ±- 0.10°F. (0.05°C.)
6. Saybolt Furol Viscosity Bath (Oil) 122°F. (50°C.) 0.10°F. (0.05°C.)

Procedure:

1. Place the standardized thermometer or temperature probe next to the thermometer in the water or oil bath.
2. Allow the thermometer to stabilize, and compare temperatures on thermometers.

   This temperature should reflect the same reading. If they do not, make note of the difference on the work sheet.
3. Adjust thermo regulator as needed so that temperature fluctuates equal distances above and below the desired temperature.
4. Record temperature range of bath.

Worksheet 15

Verification of Calibration for Asphalt Constant Temperature Bath, Water or Oil

Verification Reference: ITD-B24 Verification Frequency: 12 months

Identification Number:	Date Calibrated:
Bath Type (water, air, oil):	Calibration Standard: Thermometer Ident Number:
ASTM (there are different test methods depending on type of bath):	Required temperature range :
Is the bath of the proper size and type as required by the specification? :	☐ Yes ☐ No

After the bath is brought to the desired temperature, take successive readings at equally spaced intervals over the immersion time specified by the test method. Record readings in the following table.

Bath Temperature Readings				Specified Test Temperature	Acceptable Yes/No
1	2	3	4		

Bath Disposition:	☐ Acceptable ☐ Unacceptable

Remarks:	
Calibrated By:	Signature:
WAQTC NO.	
PREVIOUS CALIBRATION DATE:	RE-CALIBRATION DUE DATE:

Procedure 16

Verification Procedure ITD-D42

Moisture Density (Proctor) Mold Check

AASHTO T 99

AASHTO T180

Check Equipment Required:

Calipers, readable to 0.01 mm.

Scales, readable to 0.01 lbs.

Procedure:

1. The molds shall be solid-wall metal cylinders manufactured to the dimensions shown below. They shall have a detachable collar assembly approximately 60 mm (2.375 in) in height, to permit the preparation of compacted specimens of soil-water mixtures of the desired height and volume. The mold and collar assembly shall be so constructed that it can be fastened firmly to a detachable base plate made of the same material. The base plate shall be plane to 0.005 in.

2. Record measurements verifying height, diameter, and planeness are within tolerances.

3. With a clean mold, determine the mass of the mold and baseplate without the collar. Record the mass of the mold and baseplate. Verify that the new mass is the same as the mass written on the mold.

Volume Determination:

1. Determined mold volume per AASHTO T 19.

    a. Perform the steps in section 8 “Calibration of Measure” section.

    b. This volume determination will require creating a water tight seal between the mold and the base plate with a small amount of petroleum jelly, silicon grease. Another method is by applying plumbers putty to the outside of the mold to create that seal. Make sure the dry mass determination is taken with the sealing product applied.

2. Record the volume of the mold in cubic feet and write the volume of the mold on the side of the mold.

Worksheet 16

4" Moisture Density (Proctor) Mold Standardization Record

Standardization Procedure: ITD-D42 Standardization Frequency: 12 months

Identification Number:	Date Standardized:
Manufacturer:	
Calibration Standard: Caliper No:	**New** Mold Tolerances: Inside Diameter 101.19 to 102.01 Height 116.27 to 116.53 **Used** Mold Tolerances: Inside Diameter 100.99 to 102.21 Height 116.27 to 116.53

DIMENSIONAL DATA: ☐ As Found

	Inside Diameter - Top, in.	Inside Diameter - Bottom, in.	Inside Height - in.
Measurement #1			
	(90˚)	(90˚)	(180˚)
Measurement #2			
AVERAGE	D_t=	D_b=	H=

New Mold : ☐	Used Mold: ☐	
Mold Average Inside Diameter within tolerance : ☐ Yes	☐ No	
Mold Average Inside Height within tolerance : ☐ Yes	☐ No	
Calculated Volume of Mold: $V = \frac{B - C}{A}$	V= Volume of Mold, ft^3 A= Density of Water:_____ B= Mass of Water, Glass, and Mold:_____ C= Mass of Glass and Mold:_____	Volume of Mold:
Disposition of Mold: ☐ Acceptable	☐ Not Acceptable	

Remarks:	
Standardized By:	Signature:
WAQTC NO.	
PREVIOUS STANDARDIZATION DATE:	RE-STANDARDIZATION DUE DATE:

Worksheet 16

6" Moisture Density (Proctor) Mold Standardization Record

Standardization Procedure: ITD-D42 Standardization Frequency: 12 months

Identification Number:	Date Standardized:
Manufacturer:	
Calibration Standard: Caliper No:	**New** Mold Tolerances: Inside Diameter 151.74 to 153.06 Height 116.30 to 116.56 **Used** Mold Tolerances: Inside Diameter 151.41 to 153. Height 116.30 to 116.56

DIMENSIONAL DATA: ☐ As Found

	Inside Diameter - Top, in.	Inside Diameter - Bottom, in.	Inside Height - in.
Measurement #1			
	(90˚)	(90˚)	(180˚)
Measurement #2			
AVERAGE	Dt=	Db=	H=

New Mold : ☐	Used Mold: ☐
Mold Average Inside Diameter within tolerance : ☐ Yes ☐ No	
Mold Average Inside Height within tolerance : ☐ Yes ☐ No	
Calculated Volume of Mold: $V = \frac{B - C}{A}$ V= Volume of Mold, ft^3 A= Density of Water:_____ B= Mass of Water, Glass, and Mold:_____ C= Mass of Glass and Mold:_____	Volume of Mold:
Disposition of Mold: ☐ Acceptable ☐ Not Acceptable	

Remarks:	
Standardized By:	Signature:
WAQTC NO.	
PREVIOUS STANDARDIZATION DATE:	RE-STANDARDIZATION DUE DATE:

Procedure 17

Procedure ITD-D40

Moisture Density (Proctor) Manual Rammer Check

AASHTO T 99 Sec. 3.2.1 (5.5 lb)

OR

AASHTO T 180 Sec. 3.2.1 (10 lb)

Inspection Equipment Required:

1. Calipers readable to 0.01 mm
2. Tape measure readable to 1/16 in.
3. Scale, capacity of 20,000 grams. readable to 1.0 grams.

Tolerance:

Equipment shall meet the dimensional tolerances specified in AASHTO T 99 Sec. 3.2.1.

Equipment shall meet the dimensional tolerances specified in AASHTO T 180 Sec. 3.2.1.

Procedure:

1. Using the calipers measure the diameter of the rammer face by taking 2 readings 90 degrees apart.
2. Extend the rammer, measure the drop of the rammer from its highest stopping point to the bottom lip of the sleeve.
3. Remove the rammer from the sleeve by unscrewing the nut on the handle.
4. Weigh the rammer along with the nut, washers and handle.
5. Using the calipers, measure the diameter of the vent holes on the top and the bottom.
6. Measure the distance of the vent holes from the top and the bottom lips (to the center of the holes).

Worksheet 17

5.5 lb Manual Rammer Check Record

Check Procedure : ITD-D40 Check Frequency: 12 months

Identification Number:	Date Checked:
Manufacturer:	Rammer: Nominal Weight: Nominal Drop:
Calibration Standards: Caliper Number:	Balance Number:

DIMENSIONAL DATA: ☐ As Found ☐ As Adjusted

	Measurement #1	Measurement#2		ASTM REQUIREMENTS
Rammer Circular Face Diameter: mm				50.55 to 51.05 mm
Rammer Weight: grams				2486 to 2504 g
Rammer Height of Drop: mm				303 to 307 mm

Guide sleeve holes: min dia, 9.5 mm:				
TOP	#1	#2	#3	#4
BOTTOM	#1	#2	#3	#4
Guide sleeve holes: distance from end of sleeve: 18 to 20 mm				
TOP	#1	#2	#3	#4
BOTTOM	#1	#2	#3	#4

Disposition of Rammer: ☐ Acceptable ☐ Not Acceptable

Remarks:	
Checked By:	Signature:
WAQTC NO.	
PREVIOUS CHECKED DATE:	RE-CHECKED DUE DATE:

Worksheet 17

10.0 lb Manual Rammer Standardization Record

Check Procedure: ITD-D40 Check Frequency: 12 months

Identification Number:	Date Standardized:
Manufacturer:	Rammer: Nominal Weight: Nominal Drop:
Calibration Standards: Caliper Number:	Balance Number:

DIMENSIONAL DATA: ☐ As Found ☐ As Adjusted

	Measurement #1	Measurement#2		ASTM REQUIREMENTS
Rammer Circular Face Diameter: mm				50.55 to 51.05 mm
Rammer Weight:				4527 to 4545 g
Rammer Height of Drop: mm				455 to 459 mm

Guide sleeve holes: min dia, 9.5 mm:				
TOP	#1	#2	#3	#4
BOTTOM	#1	#2	#3	#4
Guide sleeve holes: distance from end of sleeve: 18 to 20 mm				
TOP	#1	#2	#3	#4
BOTTOM	#1	#2	#3	#4

Disposition of Rammer: ☐ Acceptable ☐ Not Acceptable

Remarks:	
Standardized By:	Signature:
WAQTC NO.	
PREVIOUS CHECK DATE:	RE-CHECK DUE DATE:

Procedure 18

Procedure: ITD-D6

Specific Gravity T 84 Mold &Tamper Check

Purpose:

To check the critical dimensions of the sand cone and tamper

Inspection Equipment Required:

1. Calipers or ruler readable to 1 mm.
2. Balance or scale readable to 0.1g.
3. Steel Rule.

Tolerance:

Equipment shall meet the dimensional tolerances specified AASHTO T 84.

Procedure:

1. Measure and record the inside diameter at the top of the cone to the nearest 1 mm by taking two readings 90° apart.
2. Measure and record the inside diameter at the bottom of the cone to the nearest 1 mm by taking two readings 90°apart.
3. Place the cone on a flat surface. Measure and record the depth of the cone by using the calipers and a straight-edge.
4. Measure and record the thickness of the cone to the nearest 1 mm by taking 2 readings 90° apart at the top of the cone and two readings at the bottom of the cone 90° apart.
5. Measure and record the diameter of the tamping face to the nearest 1 mm by taking two readings 90° apart using the calipers.
6. Determine the mass of the tamper to the nearest 0.1 g.

Worksheet 18

Specific Gravity Mold & Tamper Check

Check Procedure: ITD-D-6 Check Frequency: 12 (mos.)

Identification No:	Manufacturer:
Check Standards:	Caliper Ident#
	Balance Ident#
	Rule Graduations mm

Check Results: ☐ As Found ☐ As Adjusted

	#1	#2	#3	ASTM Requirement
Thickness of Cone Walls (mm)				0.8mm min.

	#1	#2	ASTM Requirements
Cone Inside Diameter (mm) Top			37 to 43 mm
Cone Inside Diameter (mm) Bottom			87 to 93 mm

	#1	#2	#3	ASTM Requirement
Cone Height (mm)				72 to 78 mm

	#1	#2	ASTM Requirements
Tamper Weight (g)			325 to 355g
Diameter of Tamping Face (mm)			22 to 28 mm

Equipment disposition: ☐ Acceptable ☐ Not Acceptable

Remarks:	
Checked by:	Signature:
WAQTC NO.	
PREVIOUS CHECK DATE:	RE-CHECK DUE DATE:

Procedure 19

Procedure ITD-D39

Liquid Limit Device and Grooving Tool Check

(AASHTO T 89, ASTM D 4318)

Purpose:

To provide instructions for checking the liquid limit device, grooving tool and cup.

Inspection Equipment Required:

1. Balance, 2000g, readable to 0.1g
2. 7" calipers, readable to 0.0001"
3. Stopwatch, readable to 0.1sec.

Tolerance:

As found in the test methods listed above.

Procedure:

1. Measure and record the thickness of the brass cup.
2. Weigh and record the weight of the brass cup.
3. Measure and record the dimensions of the L.L. base.
4. Measure the worn spot if any, where the cup contacts the base.
5. If electric, check the drop rate of two drops per minute.
6. With calipers, measure and record the dimensions of the grooving tool and gage end.

Worksheet 19

Liquid Limit Device And Grooving Tool Check

Check Procedure: AASHTO T 89 (year) Check Frequency: 12 (months)

Identification No.:		Date Checked:
Manufacturer:	Model No:	Manufacturer Serial No.:
Standard Used: Caliper Ident Number:		Balance Ident Number:

Liquid Limit Device:

Essential Dimension	A	B	C	N	K	L	M
Reading (mm)	Per Manuf.						
ASTM Tolerance	54 ±5	2 ±0.1	27 ±1.0	47 ±1.5	50±2.0	150±2.0	125±2.0

Grooving Tool:

Essential Dimension	A	B	c	d	e
Reading (mm)					
ASTM Tolerance	10 ±0.1	2 ±0.1	13.5 ±0.1	10 ±0.2	15.9

Mass of Cup: g, (Range per ASTM - D4318: 185 to 215g)

Disposition of Equipment: ☐ Satisfactory ☐ Unsatisfactory

Remarks:	
Checked by:	Signature:
WAQTC NO.	
PREVIOUS CHECK DATE:	RE-CHECK DUE DATE:

Procedure 20

Standardization Procedure ITD-D37

Procedure For Soils Pycnometer Standardization

(AASHTO T 100)

Purpose:

1. To provide a temperature correction chart for the Pycnometer filled with distilled water.

2. To verify the Pycnometer's mass.

Inspection Equipment Required:

1. Standardized Thermometer.
2. Balance capable of weighing 2000 g. readable to 0.01 g.

Tolerance:

Tolerances shall meet AASTHO T 100 8.1 and 8.2

Procedure:

1. Determine and record the clean dry mass of the Pycnometer to the nearest 0.01 g.

2. Fill the Pycnometer with distilled water at or near room temperature. Fill to the mark on the neck of the Pycnometer with the center (bottom) of the meniscus just touching the line.

3. Determine and record the mass of the Pycnometer to the nearest 0.01 g.

4. Allow Pycnometer + water to stabilize. Use a rubber stopper with a hole in its center so as to allow the thermometer to read the temperature at the mid-point of the distilled water. Record the temperature.

5. Complete a chart for the different temperatures likely to occur while testing in the Lab. Use sections 8.1 and 8.2 to calculate each Pycnometer's temperature/mass.

Worksheet 20

Soil Pycnometer Standardization Report

Standardization Procedure: ITD-D37 Standardization Frequency: 12 months

Pycnometer Number	Dry Weight (Wf)	Weight with Water (Wa)	Temperature of Water, C° (Ti)	Relative Density of Water	Correction Factor (k)	Corrected Weight

Remarks:	
Standardized by:	Signature:
WAQTC NO.	
PREVIOUS STANDARDIZATION DATE:	RE-STANDARDIZATION DUE DATE:

Procedure 21

Check Procedure: lTD-DI

L.A Wear Abrasion Machine Check

(AASHTO T 96)

Purpose:

To check the critical dimensions and general operating condition of the L.A. machine and the mass of the spheres; used as test charges.

Tolerance:

The L.A. machine shall meet the dimensional tolerances specified along with the steel spheres used to charge the machine shall meet the mass tolerances specified in the applicable test method listed above and shall be in good operating condition.

Inspection Equipment Required:

1. Steel rule readable to 1 mm
2. Stopwatch readable to 0.1 sec.
3. Balance with a 5 kg capacity, readable to 1 g.

Procedure:

1. Measure and record the inside diameter of the drum to the nearest 1 mm.
2. Measure and record the inside Length to the nearest 1 mm.
3. Measure and record the wall thickness at the left and right edges to the nearest 1 mm
4. Is the cylinder horizontal?
5. Measure and record the shelf width inside the drum to the nearest 1 mm.
6. Measure and record the distance from the shelf to the opening in the direction of rotation.
7. Record the RPM to the nearest number over a 5 minute period.
8. Check and record the number of revolutions.
9. Weigh and record the individual spheres to the nearest 1 g.
10. Record the total weight of spheres for a "B" wear to the nearest 1g.

Worksheet 21

L.A. Abrasion Check Record

Check Procedure: MTI-CAL-34, ASTM C131- (year) Check Frequency 24 (months)

ITD Identification No.	Manufacturer:
Model No.	Manufacturer Serial No
Check Standard used:	ITD Balance No
	ITD Caliper No

Drum horizontal within a tolerance of 1 in 100: ☐Satisfactory ☐Unsatisfactory

Shelf width measures 3.5 in. ±0.1 in. ☐Satisfactory ☐Unsatisfactory

Shelf is firm, rigid and straight ☐Satisfactory ☐Unsatisfactory

Shelf surface is flat with no ridge greater than 0.1 in. ☐Satisfactory ☐Unsatisfactory

Machine has uniform peripheral speed ☐Satisfactory ☐Unsatisfactory

L.A. Rattler Charge (Steel Sphere), see worksheet page 2 ☐Satisfactory ☐Unsatisfactory

Drum Dimensions:

	Measurements (Inches)				ASTM Tolerance	Acceptable Yes/No
	1	2	3	Average		
Inside Diameter					28" ±0.2"	
Inside Length					20" ±0.2"	

Revolutions:

Revolutions per minute				ASTM Tolerance	Acceptable Yes/No
1	2	3	Average		
				30 to 33 RPM	

Remarks:	
Checked by:	Signature:
WAQTC NO.	
PREVIOUS CHECK DATE:	RE-CHECK DUE DATE:

Worksheet 21

L.A. Abrasion Charge (Steel Sphere) Check

Check Procedure: ASTM C131- (year) Check Frequency: 24 (months)

Check Standard used: ITD Balance No. ITD Caliper No.	Date of Check:

Sphere Number	Diameter Readings (inches)				Weight Grams	Acceptable (390g - 445g) Yes/No
	1	2	3	Average		
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

Charge Based on Grading:

Grading	Number of Spheres	Sphere No. in Group	Total Weight Grams	ASTM Tolerance Grams	Acceptable Yes/No
A	12			5000 ±25	
B	11			4584 ±25	
C	8			3330 ±20	
D	6			2500 ±15	

Remarks:	
Checked by:	Signature:
WAQTC NO.	
PREVIOUS CHECK DATE:	RE-CHECK DUE DATE:

Procedure 22

Standardization Procedure: ITD-D41

Mechanical Soil Compactor (Proctor Mechanical Rammer) Standardization

AASHTO T 99 Section 3.2.2 & 3.2.3, AASHTO T 180 Section 3.2.2 & 3.2.3, ASTM D2168

General Equipment Inspection:

Thoroughly inspect the mechanical and manual compactors for evidence of wear, malfunction, and need of servicing and adjustment. Clean, adjust, and lubricate the compactors so as to meet all requirements of the manufacturer, and the applicable method under which they will be used and for which the mechanical compactor is to be calibrated. Operate the compactor for a minimum of 25 drops to cause friction in the parts to become constant, allowing the rammer to fall on soil or other soft material.

Inspection Equipment Required:

1. Calipers readable to 0.01 mm
2. Tape measure readable to 1/16 in.
3. Straight edge, readable to 1/16 in.
4. Scale, capacity of 20,000 grams, readable to 0.1 grams.

Inspection Tolerance:

Equipment shall meet the dimensional tolerances specified in AASHTO T 99 sec. 3.2.2 for the 5.5 lb. Rammer. The 10 lb. Rammer shall meet the specifications found in AASHTO T 180, sec. 3.2.2.

Inspection Procedure for the 5.5 lb. Rammer:

1. Open the mechanical rammer housing and remove the rammer from its holder.
2. Using the calipers measure the diameter of the rammer face by taking 2 readings 90 degrees apart.
3. Weigh the rammer and then replace the rammer to its operating position.
4. Measure the drop height of the rammer by using the following method:
    a. Remove the rammer resting plate and lower the rammer onto a pad that will not compact.

b. Measure from the top of the rammer 12 inches and place a temporary mark on one of the guide rods.

c. Set the unit to cycle for 1 drop. Take a straight edge and place it slightly above the temporary mark on the guild rod. Cycle the rammer once while observing where the ram stops at its high point. Move the position of the straight edge to correspond with this high point. Recycle the rammer and adjust your straight edge until you have an accurate releasing point of the rammer.

d. Place a second temporary mark on the guild rod at this point.

e. With the rammer setting on the cushioned pad, measure from the top of the rammer to the second mark to achieve the actual drop height.

Inspection Procedure for the 10 lb. Rammer:

The 10 lb. Rammer procedure is the same except section 4b, which should read 18 inches.

Standardization Procedure:

1. Prepare two 5-point moisture density curves according to AASHTO T 99 using a 5.5 pound manual rammer for one curve and the mechanical 5.5 lb. rammer for the other curve. Record the maximum unit weight of each curve.

2. Obtain the percent of difference (W) in the two curves by dividing the mechanical (Y') maximum unit weight by the manual (Y) unit weight.

3. If the absolute value of W is equal to or less than 2.0, the mechanical compactor is satisfactory for immediate use.

    a. If the absolute value of W is greater than 2.0, then obtain two additional sets of data. Use the same soil sample used previously. Determine W, the average percentage difference of maximum dry unit mass values for three sets of data. If the absolute value of W is equal to or less than 2.0, the mechanical compactor is satisfactory for immediate use.

    b. If the absolute value of W is greater than 2.0, then adjust the rammer mass of the mechanical compactor according to ASTM D2168 and obtain sets of three new values and compute a new value for W until the value is within the tolerance.

Worksheet 22

Mechanical Soil Compactor Standardization

Standardization Procedure: ASTM D2168 _(year) Method A

Standardization Frequency: 12 months

Identification No:	Date Standardized
Manufacturer:	Model No:
Mfg. Serial No:	Shape of Rammer Face:
Weight of Rammer:	Accuracy Requirement: 2.0% maximum % difference in max. unit weight
Calibration Balance Number:	Standardization Data: ☐ As found ☐ As Adjusted

Trial Number	Max. Unit Weight Manual Method (Y max.)	Max. Unit Weight Mechanical Method (Y' max.)	% Difference in Max. Unit Weight, (g)
1			
2			
3			
AVERAGE			(W)*

*If first Trial is within tolerance enter NA in these spaces. If not in tolerance, run 2 more Trials and compute AVG. % difference of all 3. If AVG. is out of tolerance adjust and run 3 more Trials and determine AVG.

NOTE: Attach work sheet for ASTM D698 or D1557 data used in this Standardization procedure.

Compactor Disposition: ☐ Acceptable ☐ Not Acceptable

Remarks:	
Standardized by:	Signature:
WAQTC NO.	
PREVIOUS STANDARDIZATION DATE:	RE-STANDARDIZATION DUE DATE:

Procedure 23

Procedure No. ITD-S 105

Concrete Slump Cone Check

AASHTO T 119

Inspection Equipment Required:

A measuring tape or ruler, 45 0 mm (18") minimum length.

Procedure:

1. The mold shall be made clean and free of foreign material.
2. The thickness of the metal from which the mold is made shall not be less than 1.14 mm (0.045"), at any measured point.
3. Measure the top of the mold, it should read 102 mm (4") in diameter.
4. Measure the bottom of the mold, it should read 203 mm. (8") in diameter.
5. Measure the height of the mold, it should read 305 mm (12").

Tolerances:

Individual diameters and heights shall be within ± 3.2 mm (1/8") of the specified dimensions.

Worksheet 23

Slump Cone Check Record

Check Procedure: ITD-S105 Check Frequency:12 months

Identification No.:	Date Checked:
Equipment Description: ☐ Seamless ☐ With Seam	Slump Cone Manufacturer:
Standard Used: Caliper Number	Steel Rule: Gradations:
Check Results: ☐ As Found	☐ As Adjusted

Dimensional Check Results

Thickness of Cone Walls	Reading #1	Reading #2	Reading #3	AASHTO Requirements
Top				0.045" min.
Bottom				0.045" min.

Inside Diameter	Reading #1	Reading #2	Reading #3	AASHTO Requirements
Top				3-7/8" to 4-1/8"
Bottom				7-7/8" to 8-1/8"

Cone Height	Reading #1	Reading #2	Reading #3	AASHTO Requirements
				11-7/8" to 12-1/8"

Disposition of Cone:	☐ Acceptable ☐ Not Acceptable

Remarks:	
Checked By:	Signature:
WAQTC NO.	
PREVIOUS CHECK DATE:	RE-CHECK DUE DATE:

Procedure 24

Procedure: ITD-S108

Constant Temperature Bath Concrete and Cement specimens Standardization

Inspection Equipment Required:

1. A standardized thermometer that reads to 0.1°F. (0.06°C)

Tolerance:

Concrete and Cement Specimens (water), Baths shall be maintained at 73.5ºF ± 3.5ºF (23.0 ± 2.0ºC).

Procedure:

1. Place the standardized thermometer or temperature probe next to the thermometer in the water bath.
2. Allow the thermometer to stabilize, and compare temperatures on thermometers.
3. This temperature should reflect the same reading. If they do not, make note of the difference on the work sheet.
4. Adjust thermo regulator as needed so that temperature fluctuates equal distances above and below the desired temperature.
5. Curculation divice(s) must keep the water at the required temperature throughout the bath.
6. Record temperature range of bath.

Worksheet 24

Constant Temperature Bath Concrete and Cement Specimen Calibration

Calibration Reference: ITD-S-108 Calibration Frequency: 6 months

Identification Number:	Date Calibrated:
Bath Type (water, air, oil):	Calibration Standard: Thermometer Number:
ASTM (test method determined by type of bath):	Required temperature range:
Is the bath of the proper size and type as required by the specification? :	☐Yes ☐No

After the bath is brought to the desired temperature, take successive readings at equally spaced intervals over the immersion time specified by the test method. Record readings in the following table.

Bath Temperature Readings				Specified Test Temperature	Acceptable Yes/No
1	2	3	4		

Bath Disposition:	☐ Acceptable ☐ Unacceptable

Remarks:	
Calibrated By:	Signature:
WAQTC NO.	
PREVIOUS CALIBRATION DATE:	RE-CALIBRATION DUE DATE:

Procedure 25

Standardization Procedure: ITD-D10

Unit Weight Bucket Standardization

AASHTO T 19

Inspection Equipment Required:

1. A standardized thermometer.
2. A calibrated balance readable to 5 grams (0.01 lbs)
3. A glass plate of at least 6 mm thick and 25 mm larger than the diameter of the measure.
4. A feeler gage of 0.25 mm.

Tolerance:

Measure shall comply within the standards set in AASHTO T 19

Procedure:

1. Record the serial number of the equipment to be tested.
2. Determine if the top of the rim is satisfactorily plane by using a 0.25mm feeler gage and the glass plate placed on top of the measure. The feeler gage must not be capable of being inserted between the rim of the measure and the glass plate.
3. Determine the mass of the dry measure and the glass plate. (W_1)
4. Fill the measure with water at a temperature between 60°F – 85°F and cover with the glass plate in such a way as to eliminate bubbles and excess water.
5. Wipe the outside of the measure and glass plate dry being careful not to lose any water from the measure.
6. Determine the mass of the measure, glass plate and water.(W_2)
7. Determine the mass of the water in the measure by subtracting the mass in Step 3 from the mass in Step 6.
8. Perform steps 3 through 6 a minimum of two times with the mass difference between any two determinations being 0.3 grams.
9. Measure and record the temperature of the water.
10. Determine and record water density (D) from Table 2 in WAQTC FOP for AASHTO T 121, interpolating as necessary.
11. Calculate and record the volume (V) of the measure by dividing the mass of the water by the density of the water at the measured temperature.

Worksheet 25

Unit Weight Measure (Bucket) Standardization Record

Standardization Procedure: ITD-D10 Standardization Frequency: 12 months

Identification Number:	Date Standardized:
Nominal Capacity of Measure (ft.3)	Standardization Data: ☐As Found ☐As Adjusted
Standards Used: Balance ITD Number: Thermometer ITD Number:	
1.Top Rim Planeness (0.01" or 0.25mm): ☐Acceptable ☐Not Acceptable	
2.Volumetric Calibration	
1. Mass of Measure + Glass Plate: W_1=	2. Mass of Measure + Glass Plate + Water: W_2=
3. Temperature of Water: T= ☐°F ☐°C	4. Density of Water from Table 2 @ T: D=
5. Mass of Measure + Glass Plate: W_1=	6. Mass of Measure + Glass Plate + Water: W_2=
7. Temperature of Water: T= ☐°F ☐°C	8. Density of Water from Table 2 @ T: D=
9. Volume Calculations: $V = \left[\frac{(W_2 - W_1)}{D}\right]$ V =	

Remarks:	
Standardized By:	Signature:
WAQTC NO.	
PREVIOUS STANDARDIZATION DATE:	RE-STANDARDIZATION DUE DATE:

Procedure 26

Standardization Procedure: ITD-B-22

Thermometer Standardization

Purpose:

To provide instructions for standardization of thermometers.

Inspection Equipment Required:

1. A Certified Thermometer for specific temperature.
2. Temperature Bath.
3. Ice Bath.
4. Magnifying glass with light.

Tolerance:

Tolerances can be found in ASTM E1 Table 2.

Procedure for Single Point Operation Thermometer:

1. Visually examine thermometer to be verified for separation, glass faults, etc.
2. Properly immerse both the certified thermometer and the thermometer being verified in a temperature bath maintained at test temperature. Thermometers should be placed within approximately one inch of each other and allowed time enough to stabilize (Approximately 5 minutes).
3. Read and record temperature of both thermometers.
4. Calculate difference between the two thermometers. Compare the difference to the scale error value as noted in ASTM E1 Table 2.
5. If the difference is outside the scale error maximum, repeat this procedure two more times and reject thermometer if difference remains outside of scale error maximum.

Procedure for Multi-Point Thermometer:

1. Visually examine thermometer to be verified for separation, glass faults, etc.
2. Thermometer will be verified at two temperature points, the Ice Point and the Maximum Operation Temperature Point. (The Maximum Operation Temperature Point is defined as the highest temperature the thermometer will be used at to conduct testing.)

(a) Perform Ice Point test as provided in ASTM E77 to obtain first testing point.

(b) Maximum Operation Temperature Point. Place both the certified thermometer and the thermometer being verified into the appropriate temperature bath. Adjust the bath temperature to the testing point. The thermometers shall be placed within one inch of each other, immersed to the specified level in the bath, and allowed to stabilize. (Approximately 5 minutes)

3. Read and record temperature of both thermometers.

4. Calculate difference between the two thermometers. Compare the difference to the scale error value as noted in ASTM E1 Table 2.

5. If the difference is outside the scale error maximum, repeat this procedure two more times and reject thermometer if difference remains out of scale error maximum.

Procedure for Standardized Thermometers:

1. Visually examine thermometer to be verified for separation, glass faults, etc.

2. Perform Ice Point test as provided in ASTM E77.

3. Standardized thermometer temperature reading should equal temperature recorded on the "Certificate of Calibration" (If Ice Point reading varies more than one division with the certified reading, thermometer should be replaced.

Worksheet 26

Thermometer or Temperature Recorder Standardization Record

Standardization Procedure: ASTM-E77- (year)

Standardization Frequency: 12-6 months

Identification Number:	Date Standardized:
Equipment Description:	
Thermometer Type:	Temperature Recorder Type:
Manufacturer:	Model No:
Mfg. Serial No:	
Full Range of Equipment: to ,	Graduations:
Accuracy Requirement:	Standard Used: Type: ITD Number:
☐Full Range ☐Working Range (identify):	Calibration Data: ☐As Found ☐As Adjusted

Section I

(1) Standard	(2) Equipment	(3) Standard*	(4) Equipment	(5) Standard*	Equipment Avg.	Standard Avg.	Error

* Avg. of (1) & (5) must agree with (3), if not repeat until agreement is obtained.

Section II

Ice Point: Equipment: Error= Not Applicable

Section III

Single Point Liquid-in-Glass Thermometer Calibrations Only	
Date of Initial Complete Range Calibration: Not Applicable	Equipment Disposition: ☐Acceptable ☐Not Acceptable

Remarks:	
Standardized by:	Signature:
WAQTC NO.	
PREVIOUS STANDARDIZATION DATE:	RE-STANDARDIZATION DUE DATE:

Procedure 27

Standardization Procedure No. ITD-S102

Pressure Type Concrete Air Meter Standardization

References: AASHTO T 152,

Inspection Equipment Required:

1. General purpose scale
2. Glass plate
3. Grease
4. Small flat screwdriver

Procedure:

1. Determine and record the mass of the base of the pressure meter and the glass plate together (W_1)
2. Apply a small amount of grease on the lip of the base and fill to the top with water. Carefully place the glass plate on top of the base removing excess water and being careful not to trap air under the plate. Slide as necessary. Wipe excess water from base and plate.
3. Determine and record the mass of the base, water, and glass plate together (W_2)
4. Subtract the mass of step I from the mass of step 3. This figure is the mass of water of the base (M)
5. Determine and record the mass of the 5% vessel, which comes with the pressure meter(m_1)
6. Fill the vessel to the top with water, determine and record mass on worksheet.(m_2)
7. Subtract the mass of Step 5 from the mass of Step 6 (m)
8. Determine R by dividing m by M times 100. R should equal 5%.
9. Next, screw the short piece of straight tubing into the threaded petcock hole on the underside of the cover. Clamp cover on the base with the tube extending down into the water.
10. With petcocks open, use the squeeze bulb and add water through the petcock with the pipe extension attached below, until all air is forced out of the opposite petcock.

11. Leaving both petcocks open, pump up air pressure to a point just beyond the pre-determined initial pressure line (IP). Wait a few seconds for the compressed air to cool to normal temperature and then stabilize the gauge needle at the proper initial pressure line by pumping or bleeding off as needed.

12. Close both petcocks and immediately press down on the thumb lever exhausting air into the base. Wait a few seconds until the needle is fully stabilized. At this point, if all the air was eliminated, and the initial pressure line was correctly selected, the gauge should read 0%. If two or more consecutive tests show a consistent result that differs from the 0%, then change the initial pressure to compensate for the variation. Use the newly established initial pressure for subsequent tests.

13. Once the initial pressure is established and 0% air is achieved, then screw the curved tube into the outer end of the petcock which has the pipe extension attached below. Turn the nozzle in the downward position. Take the 5% calibrating vessel, (354 ml), which comes with the gauge and hold it under the nozzle of the tube, carefully press down on the thumb lever and control water flow with the petcock. Fill the vessel with water from the base. Do not overflow the vessel.

14. Open the free petcock and release the air. Open the other petcock and allow the water to run back into the base from the curved tube. There is now 5% air in the base.

15. With petcocks open, pump the air pressure up again in the exact same manner as described in step 12. Close petcocks and immediately press the thumb lever. Wait a few seconds for the exhaust air to warm to normal temperature and for the needle to stabilize. The dial should now read 5% (A).

16. If two or more tests show consistent readings that differ from the 5% in excess of 0.2%, then remove gauge glass and reset the dial needle to 5% by turning the calibration screw located just below and to the right of the dial center.

17. When the gauge needle reads correctly at 5%, then additional water may be removed in the same manner as in step 15, to check results at 10%, 15%, and 20%, etc.

Worksheet 27

Pressure Type Concrete Air Meter Standardization Record

Standardization Procedure: ITD-S102 Standardization Frequency: 3 months

Meter Identification Number:		Date Standardized:
Manufacturer:		Type:
Mfg. Serial No:	Model No:	Size:
Calibration Balance Number:		Calibration Vessel Number:
Standardization Data: ☐ As Found ☐ As Adjusted		
STANDARDIZATION VESSEL		
Mass of Measure + Glass Plate: W_1=		Mass of Measure + Glass Plate + Water: W_2=
Mass of Water in Vessel (m) m_1 = mass Vessel = m_2 = mass Vessel + Water = $m = m_2 - m_1$ =		Mass. of Water in Measure (M) $M = (W_2) - (W_1)$ =
Calculation of R: $R = \frac{m}{(M \times 100)}$ R=		
TYPE B METERS		
Air Content Standard (R) = %		Initial Pressure (IP) per manufacturer or as determined =
Air Content Reading of Meter (A) = %		Meter Error (A-R) = %

Disposition of Meter: ☐ Acceptable ☐ Maintenance Required

Remarks:	
Standardized by:	Signature:
WAQTC NO.	
PREVIOUS STANDARDIZATION DATE:	RE-STANDARDIZATION DUE DATE:

Procedure 28

Procedure No. ITD-S104

CAPPING COMPOUND CHECK

AASHTO T 231, ASTM C617

Purpose:

To check / verify the strength of sulphur capping compound. Sulphur compounds shall have a minimum compressive strength of 34 MPa, (5,000 psi).

Inspection Equipment Required:

1. Cube mold and base plate conforming to AASHTO T 106
2. Metal cover plate conforming in principal to the design shown in Fig. 1, of AASHTO T 231
3. Mineral oil
4. Brush
5. Sulphur capping compound
6. Sulphur capping compound heating pot
7. Metal ladle
8. Meal spoon
9. Medium size flat blade screwdriver
10. Medium slip joint pliers

Procedure:

1. With the brush, put a light coat of mineral oil on the mold surfaces which will be in contact with the capping material. Put the mold assembly together and let it come to room temperature, 20°C to 30°C, (68°F to 86°F).
2. Using a sulphur heating pot, bring the temperature of the capping material to within a range of 129°C to 143°C, (265°C to 290°F). At this temperature molten sulphur compound readily segregates, so using the metal spoon, stir the pot thoroughly before each use.
3. With the metal ladle, quickly fill each of the three mold compartments until the molten material reaches the top of the filling hole. Allow sufficient time for maximum shrinkage due to cooling and solidification, approximately 15 minutes, then refill each hole with molten material
4. After solidification is complete, remove the cubes from the mold without breaking off the knob formed by the filling hole. Remove oil, fins, and sharp edges which may have formed during the casting process.
5. Check the planeness of the bearing surfaces in the manner described in AASHTO T 106. After storage at room temperature for two (2) hours, test cubes in compression following the procedure described in AASHTO T 106 and calculate the compressive strength in megapascals, (pounds per square inch).

Worksheet 28

Capping Compound Check Record

Check Procedure: ITD-S104 Check Frequency: 12 months

Reference: AASHTO T 231, Section 4

Equipment Ident No.	Check Date:
Check Equipment	
Type:	Ident No. or Serial No.
Type:	Ident No. or Serial No.
Type:	Ident No. or Serial No.
Type:	Ident No. or Serial No.

Size of Cubes			
	Cube #1	Cube#2	Cube#3
Width, inches			
Depth, inches			
Area, square inches			
Max Load, lbs			
Compressive Str, psi			
Average, psi		5,000 psi minimum	
Temperature of material		265° F to 290° F	

Name and Type of Capping Compound:

Remarks:	
Checked by:	Signature:
WAQTC NO.	
PREVIOUS CHECK DATE:	RE-CHECK DUE DATE:

Procedure 29

Procedure No. ITD-S107

CYLINDER CAPPING MOLDS CHECK

AASHTO T 231

Purpose:

To check the planeness of cylinder capping molds.

Inspection Equipment Needed:

1. Straight Edge
2. Feeler Gauge 0.002" (0.05 mm)
3. Calipers readable to 0.0001"

Procedure:

1. Lay the straight edge across the face of the capping mold.
2. Try to fit the 0.002" (0.05 mm) feeler gauge between the straight edge and the face of the capping mold.
3. The feeler gauge should not slide in. If the gauge goes in, the mold will have to be machined until a planeness of less than 0.002" (0.05 mm) is achieved.
4. Repeat this procedure for the other plate.
5. Measure the diameter of the plate with the calipers. It should be 1" greater in diameter than the specimen. The plate should be at least 1/2" thick.
6. Report the results on the report form.

Tolerances:

All capping plates, when new, shall not depart from plane by more than 0.002" (0.05mm) in any 6" of diameter. Used plates should be free of gouges and groves greater than 0.010" deep or 0.05 sq. in. in surface area.

Worksheet 29

CYLINDER CAPPING MOLDS CHECK

Check Procedure: ITD-S107 Check Frequency: 12 months

Reference: AASHTO T 231

Equipment Ident No.	Check Date:
Check Equipment	
Type:	Ident No. or Serial No.
Type:	Ident No. or Serial No.
Type:	Ident No. or Serial No.
Type:	Ident No. or Serial No.

	Machined metal plate is at least ½ in. thick	Plate is 1 in. greater in diameter than specimen	Surface does not depart from plane more than 0.002 in. in 6 in.	Surface is free of grooves or indentations
2 in				
2 in				
2 in				
3 in				
4 in				
4 in				
4 in				
6 in				
6 in				

Action Recommended: ☐Repair ☐Replace ☐No Action

Remarks:	
Checked by:	Signature:
WAQTC NO.	
PREVIOUS CHECK DATE:	RE-CHECK DUE DATE:

Procedure 30

Procedure No. ITD-S 103

BEARING BLOCKS CHECK

AASHTO T 106

Purpose:

To check the planeness of bearing blocks.

Inspection Equipment Needed:

1. Straight Edge
2. Feeler Gauge 0.001'' (0.025 mm)

Procedure:

1. Lay straight edge across the face of upper bearing block.
2. Try to fit the 0.001 " (0.025 mm) feeler gauge between the straight edge and the face of the bearing block.
3. The feeler gauge should not slide in. If the gauge goes in. the block will have to be machined until a planeness of less than 0.001" (0.025 mm) is achieved.
4. Repeat this procedure for the bottom block.
5. Report the results on the report form.

Tolerances:

All bearing blocks, when new, shall not depart from plane by more than 0.0005" (0.013 mm) and they shall be maintained at 0.001" (0.025 mm). If the bearing block is larger than 6" in diameter, they shall be maintained at 0.001" (0.025 mm) in any 6" of diameter.

Worksheet 30

BEARING BLOCKS CHECK

Check Procedure: ITD-S103 Check Frequency: 12 months

Reference: AASHTO T 106

Equipment Ident No.	Check Date:
Check Equipment	
Type:	Ident No. or Serial No.
Type:	Ident No. or Serial No.
Type:	Ident No. or Serial No.
Type:	Ident No. or Serial No.

Machine Capacity	Top Readings	No. 1	No. 2	No. 3	No. 4	No.5	Action		
							Repair	Replace	None
Test Machine Size:	Pass						☐	☐	☐
	Fail								
	Bottom Readings	No. 1	No. 2	No. 3	No. 4	No.5	☐	☐	☐
	Pass								
	Fail								

Remarks:	
Checked by:	Signature:
WAQTC NO.	
PREVIOUS CHECK DATE:	RE-CHECK DUE DATE:

Worksheet 31

CUBE MOLD (2" X 2") CHECK RECORD

Check Procedure: ASTM C109- (year) Check Frequency: 12 month

Mold Identification Number:	Check Date:
Check Standard: Type:	Serial No:
Accuracy Requirements for Molds:	(a) Planeness: 0.002" maximum deviation
	(b) Opposite Face Dimension: 1.98" to 2.02"
	(c) Height: 1.985" to 2.01"
Condition of Molds: ☐Acceptable ☐Unacceptable	

Compartment Number	Planeness*	Opposite Face Dimension		Height Avg.
		Position #1	Position #2	
1	☐S ☐U			
2	☐S ☐U			
3	☐S ☐U			

* S - Satisfactory U = Unsatisfactory

NOTE: Assure that each cube mold half is matched with the corresponding half (i.e., by serial number) before performing verification check.

Remarks:	
Checked by:	Signature:
WAQTC NO.	
PREVIOUS CHECK DATE:	RE-CHECK DUE DATE:

Worksheet 32

CONCRETE CAPPING STAND CHECK RECORD

Check Procedure: ASTM C617- (year) Check Frequency: 12 (Months)

Equipment Ident No.	Check Date:
Check Equipment	
Type:	Ident No. or Serial No.
Type:	Ident No. or Serial No.
Type:	Ident No. or Serial No.
Type:	Ident No. or Serial No.

VERIFICATION ITEMS	Results *
1. General Condition	☐S ☐U
2. Perpendicularity of alignment bars (1/8" in 12", max.)	☐S ☐U
3. Bottom Plate Thickness (½" min.)	☐S ☐U
4. Cap To Specimen Center (1/16" max. deviation)	☐S ☐U

* Indicate: S - For Satisfactory; U - For Unsatisfactory

Capping Stand Disposition: ☐ Acceptable ☐ Not Acceptable

Remarks:	
Checked by:	Signature:
WAQTC NO.	
PREVIOUS CHECK DATE:	RE-CHECK DUE DATE:

Worksheet 33

UNBONDED CAP RETAINING RING CHECK RECORD

Check Requirements: ASTM C1231- year) Check Frequency: 12 Months

Equipment Ident No.	Check Date:
Check Equipment	
Type:	Ident No. or Serial No.
Type:	Ident No. or Serial No.
Type:	Ident No. or Serial No.
Type:	Ident No. or Serial No.

VERIFICATION ITEMS	**Results ***
1. General Condition	☐S ☐U
2. Inside diameter measures between 102% and 107% of the diameter of the cylinder.	☐S ☐U
3. Planeness of surfaces (within ± 0.002") that contact Bearing Blocks	☐S ☐U
4. Bearing surfaces of the retainers shall have no gouges, grooves or indentations > 0.010 in. deep or > 0.05 in.2 in surface area	☐S ☐U

* Indicate: S - For Satisfactory; U - For Unsatisfactory

Retainer Ring Disposition: ☐ Acceptable ☐ Not Acceptable

Remarks:	
Checked by:	Signature:
WAQTC NO.	
PREVIOUS CHECK DATE:	RE-CHECK DUE DATE:

Worksheet 34

UNBONDED CAP CHECK RECORD

Check Requirements: ASTM C1231- year) Check Frequency: 12 Months

Equipment Ident No.	Check Date:
Check Equipment	
Type:	Ident No. or Serial No.
Type:	Ident No. or Serial No.
Type:	Ident No. or Serial No.
Type:	Ident No. or Serial No.

	CHECK ITEMS	**Results ***
1.	Unbonded Cap(s) indicate Manufactures / Suppliers name, Shore hardness, applicable concrete compressive strength data	☐S ☐U
2.	Documentation / records indicating the date caps were put into service, cap hardness / durometer, number of tests(1).	☐S ☐U

(1) Maximum number of tests per set of caps: 100.

* Indicate: S - For Satisfactory; U - For Unsatisfactory

Unbonded cap Disposition: ☐ Acceptable ☐ Not Acceptable

Remarks:	
Checked by:	Signature:
WAQTC NO.	
PREVIOUS CHECK DATE:	RE-CHECK DUE DATE:

Procedure 35

Procedure No. ITD-D-44

Procedure for Verification of Angle Measurement Instrument (RAM) Calibration

AASHTO T 344, ASTM D7115

Equipment Required:

3. Rapid Angle Measurement Kit; includes a Rapid Angle Measurement (RAM) instrument and Calibration Tube.
4. Each RAM shall have the verification of calibration performed using the kit Calibration Tube before each use.
5. Temperature of the RAM and calibration Tube must be the same.

Tolerance:

Plus or minus 0.01.

Procedure:

A log shall be kept with the unit. This log will include:

7. The serial numbers for both the RAM and Calibration Tube
8. Manufactures certificate of calibration date from the Calibration Tube (not to exceed 12 months)
9. Manufactures certificate of calibration date from the RAM (not to exceed 36 months)
10. Calibration angle (etched on the Calibration Tube)
11. Date of Verification of calibration / use date
12. Temperature
    a. RAM and Calibration Tube (must be the same)
13. Reading(s) from RAM unit
    a. Verification shall be 3 readings performed and recorded.

.

If the RAM unit fails the verification process, fails to produce the same answer as is inscribed on the Calibration Tube, perform the following.

Re-calibrate the RAM unit following the PINE operating instructions. Once the unit is re-calibrated perform 3 verifications. If at this point the RAM is not verifying calibration the RAM and Calibration Tube shall be sent to PINE for Calibration.

Schedule:

- RAM Calibration Tube - calibration verified by PINE every 12 months.
- RAM - recalibration by manufacture every 90 uses but not exceed 36 months.

Worksheet 35

Superpave Gyratory Compactor (SGC) Internal Angle Measurement Verification Form

Calibration Verification Procedure: ITD-D-44 Calibration Verification Frequency: 12 months

	Angle Measurement Instrument Information (For Use with Pine Instruments Superpave Gyratory Compactor)							
Serial No:				**Calibration Date:**				
Model No:				**Calibration Due:**				
Eccentricity (mm):				**RAM Temperature:**				
							Within Spec	**Out of Spec**
	1	2	3	**AVE.**	**Difference:**			
Verification Readings:								
					Spec. +/- 0.01			

Remarks:

Calibration Verification by:	Signature:
WAQTC NO.	
PREVIOUS CALIBRATION VERIFICATION DATE:	RE- CALIBRATION VERIFICATION DUE DATE:

Worksheet 36

RAM Instrument Calibration Verification Record

Calibration Verification Procedure: ITD-D-44 Calibration Verification Frequency: As noted

Angle Measure Instrument RAM				
Make and Model	Serial Number for RAM	Serial Number for Calibration Tube	Calibration Angle of Tube	Eccentricity (mm)
Certification Date of RAM	Certification Date of Calibration Tube	Temperature of RAM & Tube		

Verification		Reading 1	Reading 2	Reading 3	Average	Difference (Eccentricity. – Ave.)	Spec: +/- 0.01	
Date	By						Within Spec	Out of Spec
							☐	☐
							☐	☐
							☐	☐
							☐	☐
							☐	☐
							☐	☐
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							☐	☐
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							☐	☐
							☐	☐

SECTION 300.00 – ITD CENTRAL LABORATORY

The first formal testing of materials for Idaho highways took place at the University of Idaho in Moscow, Idaho in 1919. Later, as the need expanded, a small laboratory was set up in the basement of the Capitol Building in Boise in 1926. This laboratory operated until 1939 when a Central Laboratory building was built at 27th and Main Streets in Boise. In 1971 the Central Laboratory moved to the present location at 3293 Jordan Street in Boise. The Central Laboratory is comprised of separate laboratory units that perform specific laboratory tests. Refer to each section for a description of the laboratory unit and its function as follows:

- Aggregate-Asphalt Mix Laboratory Section 310.00
- Soils Laboratory Section 320.00
- Geotechnical Laboratory Section 330.00
- Chemistry Laboratory Section 340.00
- Asphalt Binder Laboratory Section 350.00
- Structures and Cement Laboratory Section 360.00

300.01 Accreditations. ITD Central Laboratory is AASHTO accredited.

300.02 Subject Matter Experts. The Central Laboratory provides subject matter experts (SME) from each of its laboratory units for the following needs:

- Professional oversight of specific materials testing methodology.
- Evaluate products for the Qualified Product List (QPL).
- Consultative services to the Districts, Contractors, Consultants, and other agencies for material testing.
- The Laboratory units work closely with the technical engineers from the Construction/Materials Section as needed to provide these services.

300.03 Referenced Documents.

- State of Idaho Contract and Plans (per project)
- Idaho Transportation Department Standard Specifications for Highway Construction
- Idaho Transportation Department Quality Assurance Manual
- AASHTO Standard Specifications for Transportation Materials and Methods of Sampling and Testing (http://itdintranetapps/apps/ihs/ihs.aspx)
- ASTM Standards (http://compass.astm.org/CUSTOMERS/filtrexx40.cgi?index.frm)

SECTION 310.00 AGGREGATE & ASPHALT MIX LABORATORIES

The Aggregate and Asphalt Mix Laboratories use approved testing procedures to provide consistent and reliable information to evaluate aggregate and asphalt mix materials. The information is used to determine the suitability of the material for use in highway construction and compliance to design specifications.

All materials received must be tested in accordance with the specifications of the awarded contract for each project. If no contract has been awarded, testing will be performed according to the requirements of the ITD Standard Specifications for Highway Construction.

310.01 Aggregate Laboratory. The Aggregate Laboratory is responsible for the analysis of aggregates submitted by the District Materials Engineers from Materials Source investigations for use in state of Idaho highway projects and for materials sampled from projects for project development and construction purposes. Aggregates submitted are primarily tested for the following:

- Quality Characteristics for materials source and project purposes.
- Establishing the need and quantity, if any, for anti-stripping additive for asphalt used in mix designs (AASHTO T167-ASTM D1075 and/or AASHTO T283) for materials source purposes
- Establishing the compaction target for aggregate base and granular borrow for materials source and project purposes
- The strength of compacted base and granular borrow materials (R-Value) for materials source and project purposes.

310.01.01 Testing Requirements. The following categories of testing are performed by the Aggregate Laboratory.

- Sample Preparation: Sieving, splitting, and test sample makeup.
- Aggregate Quality: L. A. Wear, Idaho Degradation, Sand Equivalent, Ethylene Glycol, and Soundness of Aggregate.
- Superpave Consensus Properties: Fracture Count, Sand Equivalent, Uncompacted Voids in Fine Aggregate, and Specific Gravity of Coarse and Fine Aggregate.
- Compaction: Vibratory Compaction, Standard Compaction (Moisture Density), Specific Gravity, and Sand Equivalent.
- Strength of Compacted Base and Granular Borrow: Moisture Conditioning, R-Value, Specific Gravity, and Sand Equivalent.
- Additional Testing: Cleanness of Cover Coat Aggregate and Loose Unit Weight.

310.01.02 Test Methods. Table 310.02.02.1 provides the AASHTO or ASTM designation for each test method performed.

Table 310.02.02.1: Aggregate Laboratory Test Methods

Test Method	Description
FOP for AASHTO T 11	Materials Finer Than 75 μm (No. 200) Sieve in Mineral Aggregates by Washing
AASHTO T 19	Unit Weight and Voids in Aggregate
FOP for AASHTO T 27	Sieve Analysis of Fine and Coarse Aggregates
FOP for AASHTO T 84	Specific Gravity and Absorption of Fine Aggregate
FOP for AASHTO T 85	Specific Gravity and Absorption of Coarse Aggregate
AASHTO T 96	Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
FOP for AASHTO T 176	Plastic fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test
FOP for AASHTO R 76	Reducing Samples of Aggregate to Testing Size
FOP for AASHTO T 304	Uncompacted Void Content of Fine Aggregate
FOP for AASHTO T 335	Fracture Count
IDAHO IT-15	Idaho Degradation
IDAHO IT-72	Cleanness of Cover Coat Material
IDAHO IT-74	Vibratory Spring-Load Compaction for Coarse Granular Material
IDAHO IT-116	Ethylene Glycol
IDAHO IT-144	Specific Gravity and Absorption of Fine Aggregate Using Automatic Vacuum Sealing (CoreLok) Method

310.02 Asphalt Mix Laboratory. The Asphalt Mix Laboratory is responsible for the analysis of bituminous mixtures submitted for highway projects.

310.02.01 Testing Requirements. The following categories of testing and calculations are performed by the Asphalt Mix Laboratory.

- Sample Preparation: Heating, mixing, and splitting.
- Asphaltic Mixture Testing of Laboratory and Field produced samples: Superpave Gyratory Compaction, Rut depth using Asphalt Pavement Analyzer, Ignition Furnace, Sieve Analysis, Maximum Specific Gravity (Rice Method), Bulk Specific Gravity, Density, Voids in Mineral Aggregate, Mix Air Voids, Effective Asphalt Content, Asphalt Film Thickness, and Effects of Moisture.

310.02.02 Test Methods. Table 310.02.02.1 provides the AASHTO or ASTM designation for each test method performed.

Table 310.02.02.1: Asphalt Mix laboratory Test Methods

Test Method	Description
FOP for AASHTO T 30	Mechanical Analysis of Extracted Aggregate
ASTM D1075*	Effect of Water on Cohesion of Compacted Bituminous Mixtures
FOP for AASHTO T 166	Bulk Specific Gravity of Compacted Bituminous Mixtures Using Saturated Surface-Dry Specimens
AASHTO T 167	Compressive Strength Bituminous Mixtures
FOP for AASHTO T 209	Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
FOP for AASHTO T 340	Determining Rutting Susceptibility of Hot Mix (HMA) Using the Asphalt Pavement Analyzer (APA)
FOP for AASHTO R 76	Reducing Samples of Aggregate to Testing Size
AASHTO T 269	Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures
FOP for AASHTO R-47	Reducing Samples of Hot Mix Asphalt (HMA) to Testing Size
AASHTO T 283	Moisture Induced Damage of HMA
FOP for AASHTO T 308	Standard Test Method for Determining the Asphalt Content of Hot Mix Asphalt (HMA) by the Ignition Method
FOP for AASHTO T 312	Preparing and Determining the Density of Hot Mix Asphalt (HMA) Specimens by Means of Superpave Gyratory Compactor
Idaho IR-125	Acceptance Test Strip for Plant Mix Pavement

*Formerly AASHTO T 165

SECTION 320.00 SOIL LABORATORY

The Soil Laboratory tests the physical properties of soil for project development, source development, construction projects, research, and other agencies.

320.01 Test Methods. Table 320.03.1 provides the AASHTO, ASTM, or Idaho designation for each test method.

Table 320.01.1: Soils Tests

Test Method	Description
FOP for AASHTO T 11	Standard Method of Test for Materials Finer Than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing
FOP for AASHTO T 27	Standard Method of Test for Sieve Analysis of Fine and Coarse Aggregates
FOP for AASHTO T 85	Standard Method of Test for Specific Gravity and Absorption of Coarse Aggregate
AASHTO T 87	Standard Method of Test for Dry Preparation of Disturbed Soil and Soil Aggregate Samples for Test
AASHTO T 88	Standard Method of Test for Particle Size Analysis of Soils
AASHTO T 89	Standard Method of Test for Determining the Liquid Limit of Soils
AASHTO T 90	Standard Method of Test for Determining the Plastic Limit and Plasticity Index of Soils
FOP for AASHTO T 99	Standard Method of Test for Moisture-Density Relations of Soils Using a 2.5-kg (5.5-lb) Rammer and a 305-mm (12-in.) Drop
AASHTO T 100	Standard Method of Test for Specific Gravity of Soils
FOP for AASHTO T 180	Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop
AASHTO T 215	Standard Method of Test for Permeability of Granular Soils (Constant Head)
AASHTO T 265	Standard Method of Test for Laboratory Determination of Moisture Content of Soils
AASHTO T 267	Standard Method of Test for Determination of Organic Content in Soils by Loss on Ignition

Test Method	Description
AASHTO T 288	Standard Method of Test for Determining Minimum Laboratory Soil Resistivity
AASHTO T 289	Standard Method of Test for Determining pH of Soil for Use in Corrosion Testing
AASHTO T 307	Standard Method of Test for Determining the Resilient Modulus of Soils and Aggregate Materials
AASHTO M 145	Standard Specification for Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes
Idaho IT-8	Resistance R-Value and Expansion Pressure of Compacted Soils and Aggregates R-Value (Stability)
ASTM D2487	Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)

320.02 Tests Performed by the Soil Laboratory for the Aggregate Laboratory. Some of the Aggregate Laboratory tests require an R-Value and a Specific Gravity for fine-grained materials. The Aggregate Laboratory Technicians will break out the samples according to their procedures and deliver the sample to Soil Laboratory for testing. The test results are logged in the Soil Laboratory database and a copy of the tests results are delivered to the Aggregate Laboratory.

SECTION 330.00 GEOTECHNICAL LABORATORY

The Geotechnical Laboratory performs tests to determine physical and mechanical properties of undisturbed soil samples, remolded samples, and rock cores submitted by the districts.

The Geotechnical Laboratory also performs tests on geotextiles and geogrids, mostly for quality assurance during project construction. Testing is sometimes performed for other purposes, such as for research projects.

The Central Laboratory Manager or Geotechnical Engineer should be consulted for determining the types of test that are needed for each project.

330.01 Preparation of Samples. Most of the soil samples submitted to the Geotechnical Laboratory are undisturbed ring samples, Shelby tubes, or block samples. Shelby tubes or block samples will be trimmed to the required sizes for testing. Disturbed soil samples are sometimes received by the laboratory and in these cases; remolded samples are created in the lab for testing. Rock cores are normally submitted for strength tests and they are cut to the properly size for testing. Geotextile or geogrid samples are cut to sizes needed for different tests.

330.02 Testing of Samples. All tests are performed according to the test methods listed in the next section and the instructions of the Central Laboratory Manager or the Geotechnical Engineer.

330.03 Geotechnical Tests for Soils and Rock. Table 330.03.1 provides the AASHTO, ASTM, or other designation for each test method performed.

Table 330.03.1: Geotechnical Tests for Soil and Rock

Test Method	Description
ASTM D2166	Standard Method of Test for Unconfined Compressive Strength of Cohesive Soil
ASTM D7012	Standard Method of Test for Compressive Strength of Intact Rock
AASHTO T 216	Standard Method of Test for One-Dimensional Consolidation Properties of Soils
AASHTO T 236	Standard Method of Test for Direct Shear Test of Soils under Consolidated Drained Conditions
AASHTO T 296	Standard Method of Test for Unconsolidated, Undrained Compressive Strength of Cohesive Soils in Triaxial Compression
AASHTO T 297	Standard Method of Test for Consolidated, Undrained Triaxial Compression Test on Cohesive Soils
ASTM D5731	Determination of the Point Load Strength Index of Rock and Application to Rock Strength Classifications

330.04 Geotechnical Tests for Geosynthetic Materials. Table 330.04.1 provides the AASHTO, ASTM, or other designation for each test method performed.

Table 330.04.1: Geotechnical Tests for Geosynthetics

Test Method	Test
ASTM D4533	Standard Test Method for Trapezoid Tearing Strength of Geotextiles
ASTM D4632	Standard Test Method for Grab Breaking Load and Elongation of Geotextiles
ASTM D6241	Standard Test Method for Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe
ASTM D4595	Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method
ASTM D4491	Standard Test Methods for Water Permeability of Geotextiles by Permittivity
ASTM D6637	Standard Test Method for Determining Tensile Properties of Geogrids by the Single or Multi-Rib Tensile Method
COE- CW-02215	Geogrid – Apparent Opening Size

330.05 Geosynthetic Material Price Adjustment. Acceptance of geosynthetics will be in accordance with ASTM D4759 Standard Practice for Determining the Specification Conformance of Geosynthetics. When verification test results indicate the material does not meet the required specifications for a specific lot, a price adjustment will be applied as shown in Table 330.05.1 and Table 330.05.2.

The price adjustments will accumulate for each property that does not meet the specification, however, if more than two properties are out of specifications, the geotextile or geogrid of that specific lot will be rejected. When one property is more than 40% out of specification, the geotextile or geogrid will also be rejected.

Table 330.05.1: PRICE REDUCTION SCHEDULE FOR GEOSYNTHETIC MATERIALS GEOTEXTILES

Property	Test Method	Price Reduction	REMARKS
Grab Tensile Strength	ASTM D4632	The amount of the price adjustment is equal to the percentage difference of the test result and the specification limit.	Minimum Price Reduction is 10%
Grab Elongation	ASTM D4632	The amount of the price adjustment is one-half of the percentage difference of the test result and the specification limit.	
Puncture Strength	ASTM D6241	The amount of the price adjustment is equal to the percentage difference of the test result and the specification limit.	Minimum Price Reduction is 10%
Trapezoidal Tear Strength	ASTM D4533	The amount of the price adjustment is equal to the percentage difference of the test result and the specification limit.	Minimum Price Reduction is 10%
Apparent Opening Size (AOS)	ASTM D4751	The amount of the price adjustment is one-half of the percentage difference of the test result and the specification limit.	
Permittivity	ASTM D4491	The amount of the price adjustment is equal to the percentage difference of the test result and the specification limit.	Minimum Price Reduction is 10%

Table 330.05.2 PRICE REDUCTION SCHEDULE FOR GEOSYNTHETIC MATERIALS
GEOGRIDS

Property	Test Method	Price Reduction	REMARKS
Aperture Size Range	No test Method. Calipers are used.	The amount of the price adjustment is one-half of the percentage difference between the test result and the specification limit.	
Open Area	COE CW-02215	The amount of the price adjustment is one-half of the percentage difference between the test result and the specification limit.	
Tensile Strength	ASTM D6637	The amount of the price adjustment is equal to the percentage difference of the test result and the specification limit.	Minimum Price Reduction is 10%
Junction Strength	GRI-GG2 (2000) (not tested at ITD)	The amount of the price adjustment is equal to the percentage difference of the test result and the specification limit.	Minimum Price Reduction is 10%(not applied)

SECTION 340.00 CHEMISTRY LABORATORY

The Chemistry Laboratory's responsibility is to provide accurate, reliable, and consistent chemical and physical analyses of a wide variety of materials used in the construction and maintenance of the highways. The Chemistry Laboratory work includes:

- To monitor submitted samples of materials for ITD specification compliance in both Quality Control and Quality Assurance Programs.
- To conduct analyses and evaluations on project related Quality Assurance samples, and submitted samples for award of statewide contracts.
- The Chemistry Laboratory conducts research on new products and testing procedures.
- The Chemistry Laboratory generates new specifications for developing materials.

340.01 Reference Documents.

- AASHTO Standard Specifications for Transportation Materials and Methods of Sampling and Testing
- American Standards of Testing and Materials (ASTM)
- ITD Standard Specifications for Highway Construction
- Special Provisions from Department contracts (SP)
- Standard Special Provisions (SSP)
- Steel Structures Painting Council Specifications and Test Methods (SSPC)
- United States Federal Specifications and Test Methods (FSTM)
- United States Military Specifications and Test Methods (Mil Specs)
- Idaho Test Methods (IT)
- ITD Quality Assurance Manual
- Society of Automotive Engineers Manuals (SAE)
- Handbook of Lubrication Engineering
- Idaho Transportation Department Contract and Plans
- Standard Methods for the Examination of Water and Wastewater (SM)
- National Association of Corrosion Engineers (NACE)
- United States Environmental Protection Agency (EPA)
- United States Department of Agriculture (USDA) Agricultural Handbook No. 60, Diagnosis
- Improvement of Saline and Alkaline Soils Methods.

340.02 Chemistry Laboratory Functions. Sample frequency for construction and maintenance materials is dictated by the Department MTRs Section 270 from the Idaho Quality Assurance Manual and/or as documented in Department contracts. General sample preparation is determined by the individual testing protocol. Testing tolerances for the materials being tested are governed by the ITD Standard Specifications. Test results must be within the specifications listed unless otherwise noted.

Samples received from a project or contracts are tested as routine or complete samples. Complete testing includes a series of tests as outlined in the next section. Routine testing involves a set of two or more tests. If any problem is found with the routine testing results, the material may then be tested according to the guidelines for complete analysis. Routine and complete testing is performed on materials with continual use throughout the contract year. Testing frequency is determined by the sequence of the samples submitted statewide as control samples. Occasionally, the Chemistry Laboratory will outsource samples requiring specialized testing procedures.

ITD's Preventative Maintenance Oil Analysis Program requires the Chemistry Laboratory to monitor state-owned equipment. As a part of this program, the Chemistry Laboratory performs chemical and physical analyses on used lubricating and hydraulic oils. This includes testing, evaluation, and interpretation of the test data to create a historical trend for the particular component of equipment. The Chemistry Laboratory coordinates with the ITD Maintenance Equipment Analyst to make appropriate recommendations for maintenance of the equipment tied to the historical trend data.

340.03 Not Used.

340.04 Out-of-Specification Material. Material that is determined by laboratory test results as out-of-specification must be removed and replaced unless allowed to remain with a price adjustment as detailed in the following sections. The price adjustment is applied to the invoice price of the material from the supplier to the contractor excluding shipping costs, unless otherwise noted.

340.04.01 Price Adjustment Letter. A price adjustment letter must be prepared when submitting a test report that includes out-of-specification material. The letter will include only one supplier's failures. Different suppliers, contracts, and contract items will not be used in the same letter.

The letter will be signed by the Central Laboratory Manager and accompany the test reports for distribution.

340.05 Testing Requirements. The following sections describe the various materials tested by the Chemistry Laboratory and the action for out-of-specification material. An asterisk (*) denotes a modification in the specified testing procedure.

340.05.01 Antifreeze. Sample Frequency: As determined in the Department contract.

Specifications:

FS A-A-52624A Federal Specifications for Antifreeze, Multi-Engine Type

Test Methods	Description
ASTM D92	Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester
ASTM D 1119	Standard Test Method for Percent Ash Content of Engine Coolants and Anti-rusts
ASTM D1120	Standard Test Method for Boiling Point of Engine Coolants
ASTM D1121	Standard Test Method for Reserve Alkalinity of Engine Coolants and Anti-rusts
ASTM D1122	Standard Test Method for Density or Relative Density of Engine Coolant Concentrates and Engine Coolants by the Hydrometer
ASTM D1287	Standard Test Method for pH of Engine Coolants and Anti-rusts
ASTM D1177	Standard Test Method for Freezing Point of Aqueous Engine Coolants
ASTM D1881	Standard Test Method for Foaming Tendencies of Engine Coolants in Glassware

Noncompliant Material and Price Adjustment: Noncompliant material is not accepted. The product is returned to the manufacturer and replaced with acceptable material. Price adjustments are not in place for this material.

340.05.02 Cement (Portland). Sample frequency and testing for Section 502 Structural Concrete and Section 409 Concrete Paving will be according to Section 270 in the ITD Quality Assurance Manual.

For bid schedule item 308 Cement Recycled Asphalt Base Stabilization cement samples, an XRF Scan will be performed for cement type.

Specifications:

AASHTO M 85 Standard Specification for Portland Cement

AASHTO M 240 Blended Hydraulic Cement

Test Methods:

AASHTO T 105 Standard Method of Test for Chemical Analysis of Hydraulic Cement

ASTM C114 Standard Test Methods for Chemical Analysis of Hydraulic Cement

Noncompliant Material and Price Adjustment: Noncompliant material is not accepted. The product is returned to the manufacturer and replaced with acceptable material. If product cannot be returned, the following price adjustment for Total Alkali Content is recommended:

Total Alkali Content (Percent):

Total Alkali Content (Maximum of 0.60%)	Price Adjustment
Less than or equal to 0.62	None
Greater than 0.62 but less than or equal to 0.64	15% of cement used
Greater than 0.64	25% of Contract item quantity

340.05.03 Chloride in Concrete. Sample Frequency: As requested by the District Materials Engineer

Test Methods:

IDAHO IT-131	Standard Method of Test for Total Chloride Content of Hardened Concrete by Gran Plot Method
AASHTO T 260	Standard Method of Test for Sampling and Testing for Chloride Ion in Concrete and Concrete Raw Materials

Noncompliant Material and Price Adjustment: Not applicable.

340.05.04 Curing Compound. Sample Frequency: According to Section 270 of the ITD Idaho Quality Assurance Manual.

Specifications:

ASTM C309 Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete

Test Methods	Description
AASHTO T 155	Standard Test Method for Water Retention by Concrete Curing Materials
ASTM D1644	Standard Test Methods for Nonvolatile Content of Varnishes
ASTM D1475	Standard Test Method for Density of Liquid Coatings, Inks, and Related Products
ASTM E1347	Standard Test Method for Color and Color-Difference Measurement by Tristimulus (Filter) Colorimetry

Noncompliant Material and Price Adjustment: Noncompliant material is not accepted. The product is returned to the manufacturer and replaced with acceptable material. Price adjustments are not in place for this material.

340.05.05 De-icing and Anti-Icing Chemicals. The following sections give the testing requirements by category.

Sample Frequency: As determined by Department contract.

Chemical products included are as follows:

Category 1	Corrosion Inhibited Liquid Magnesium Chloride
Category 2	Corrosion Inhibited Liquid Calcium Chloride
Category 3	Non Corrosion Inhibited Liquid Calcium Magnesium Acetate
Category 4A	Corrosion Inhibited Solid Sodium Chloride (Corrosion Percent Effectiveness of 30% or less)
Category 4B	Corrosion Inhibited Solid Sodium Chloride (Corrosion Percent Effectiveness of 31% to 85%)
Category 5	Corrosion Inhibited Sodium Chloride Plus 10% Magnesium Chloride (Solid)
Category 6	Corrosion Inhibited Sodium Chloride Plus 20% Magnesium Chloride (Solid)
Category 7	Calcium Magnesium Acetate (Solid)
Category 8A-B	Non Corrosion Inhibited Sodium Chloride (Standard Gradation, Brining Salt, Insoluble Material less than 1%, and Moisture less than 0.5%)
Category 8A-R	Non Corrosion Inhibited Sodium Chloride (Standard Gradation, Road Salt, Insoluble Material less than 10%, and Moisture less than 0.5%)
Category 8B	Non Corrosion Inhibited Sodium Chloride (Insoluble Material less than 10%, and Moisture less than 5.0%)
Category 8C-B	Non Corrosion Inhibited Sodium Chloride (Fine Gradation, Brining Salt, Insoluble Material less than 1%, and Moisture less than 0.5%)
Category 8C-R	Non Corrosion Inhibited Sodium Chloride (Fine Gradation, Road Salt, Insoluble Material less than 10%, and Moisture less than 0.5%)
Category 9	Corrosion Inhibited Liquid Sodium Chloride
Category 10	Corrosion Inhibited Liquid Sodium Chloride Plus Calcium Chloride
Category 11	Corrosion Inhibited Liquid Chloride Blended Brines
Category	Experimental

Inhibitor Products are as follows:

Category A1	Corrosion Inhibitor for Sodium Chloride Brine (Minimum 21% NaCl)
Category A2	Corrosion Inhibitor for Sodium Chloride and Calcium Chloride Brine (Minimum15% NaCl & 2% CaCl2)
Category A3	Corrosion Inhibitor for Sodium Chloride (Minimum 15% NaCl)

Specifications:

Pacific Northwest Snowfighters (PNS) and ITD (PNS Website- http://www.pnsassociation.org)

Test Methods	**Description**
PNS and ITD	Test Methods and Appendixes
ASTM E534	Standard Test Methods for Chemical Analysis of Sodium Chloride
ASTM D632	Standard Specifications for Sodium Chloride
ASTM D1293	Standard Test Methods for pH of Water
ASTM D1429	Standard Test Methods for Specific Gravity of Water and Brine
SM 3111A*	Metals by Flame Atomic Absorption Spectrometry
SM 3112B*	Cold-Vapor Atomic Absorption
SM 3125B*	Atomic Absorption
SM 4500-P*	Phosphorus
SM 4500-CN*	Cyanide
NACE TM-0169-95*	Standard Test Method – Laboratory Corrosion Testing of Metals – PNS Modified

*See Chemistry Central Laboratory Personnel for current Method Procedures

Noncompliant Material and Price Adjustment: Statewide contracted material will follow the contract-specified price adjustments included with in the contract. For material purchased for use but not under the statewide contract, follow the terms outlined below.

Noncompliant material is not accepted. The product is returned to the manufacturer and replaced with acceptable material. If product cannot be returned, the following price adjustments are recommended as per the contract:

Percent Concentration (Liquid Only)

340.05.05.01 Bidder Quoted Concentration (BQC)

BQC (25.0% Minimum)

Percent of total shipment or lot number as represented by sample	Price Adjustment
BQC less 1%	None
25.0% to BQC less 1.1%	25%
24.0% to 24.9%	50%
Less Than 24.0%	100%

340.05.05.02 Total Metals, Total Phosphorus, and Total Cyanide

Percentage Over the Specified Limit

Percent of total shipment or lot number represented by sample	Price Adjustment
0% to 5.0%	None
5.1% to 20.0%	15%
20.1% to 40.0%	25%
40.1% to 75.0%	35%
75.1% to 100.0%	50%
Over 100.1%	100%

340.05.05.03 Percent Corrosion Effectiveness

Samples will be tested against their PNS QPL established Corrosion Effectiveness percentage. Each product will be placed into one of the following ranges based upon their qualified Corrosion Effectiveness value.

Corrosion Effectiveness Ranges
25.0% to 30.0%
20.0% to 24.9%
15.0% to 19.9%
10.0% to 14.9%
5.0% to 9.9%
Less than 5.0%

Price adjustments will be taken on material that is more corrosive than it was qualified at according to the following table.

Corrosion Effectiveness Range	Price Adjustment
Percent of total shipment or lot number represented by sample	
1	None
2	50%
3	100% or Rejection

Corrosion Effectiveness (30.0% Maximum)

Percent of total shipment or lot number represented by sample	Price Adjustment
30.1% to 35.0%	15%
35.1% to 50.0%	50%
Greater than 50.0%	100% or Rejection

340.05.05.04 Total Settleable Solids (percent by volume)

Settleable Solids (1.0% Maximum)

Percent of total shipment or lot number represented by sample	Price Adjustment
1.1% to 1.5%	None
1.6% to 3.5%	25%
3.6% to 5.0%	50%
5.1% to 7.5%	75%
Greater than 7.5%	100% or Rejection

340.05.05.05 Percent Passing No. 10 Sieve (percent by volume)

Percent Passing the No. 10 Sieve (99.0% Minimum)

Percent of total shipment or lot number represented by sample	Price Adjustment
98.5% to 98.9%	None
98.0% to 98.4%	35%
97.5% to 97.9%	50%
Less than 97.5%	100% or Rejection

340.05.05.06 Gradations. Gradations outside the following limiting tolerances will be assessed a price adjustment of 10% of the total shipment or lot number as represented by the sample.

Sieve Size	Wt. % Passing	Permissible Variation
3/4"	100%	$\pm$ 5%
# 4	15% to 100%	$\pm$ 5%
# 8	5% to 65%	$\pm$ 5%
# 30	0% to 20%	$\pm$ 5%

340.05.05.07 Moisture Content. Category 8A material must be dried to a maximum moisture content of 0.5% (percent by weight). Water in excess of 0.5% of dry salt weight will not be paid for. The amount of salt to be paid for, when moisture exceeds 0.5%, will be computed as follows:

$$Pay\ Weight = \frac{(100.5 \times Wet\ Weight.of\ Salt)}{(100 + Percent\ of\ Moisture)}$$

Category 8B material must be dried to a maximum moisture content of 5.0% (percent by weight). Water in excess of 5.0% of dry salt weight will not be paid for. The amount of salt to be paid for, when moisture exceeds 5.0%, will be computed as follows:

$$Pay\ Weight = \frac{(105.0 \times Wet\ Weight.of\ Salt)}{(100 + Percent\ of\ Moisture)}$$

340.05.06 Dust Abatement – Magnesium Chloride.

Sample Frequency: According to the Idaho Quality Assurance Manual or Department contract.

Specifications:

Idaho Transportation Department Standard Specifications for Highway Construction

Test Methods:

PNS and ITD Test Method 1, Appendix A

Noncompliant Material and Price Adjustment: The price adjustments will as shown in the following table.

Contract-Specified Concentration

Contract-Specified Concentration (28.0% Minimum)

Percent of total shipment or lot number represented by sample	Price Adjustment
27.5% to 27.9%	None
26.5% to 27.4%	25%
25.5% to 26.4%	50%
Less Than 25.4%	100%

340.05.07 Fencing.

Sample Frequency: According to the Idaho Quality Assurance Manual or Department Contract.

Sample Testing Tolerance: The laboratory testing tolerance for weight of coatings on galvanized (zinc only) products shall be set at not more than 0.03 oz/ft^2 less the minimum coating requirement for all Classes and Types of fencing materials. All products with a galvanized coating weight less than the minimum coating weight value, including the sample testing tolerance, will be noncompliant material and will not be accepted. Material is returned to the manufacturer and replaced with acceptable material. Price adjustments are not in place for this material.

340.05.07.01 Barbed Wire.

Specifications:

AASHTO M 280 Standard Specification for Metallic-Coated (Carbon) Steel Barbed Wire

Test Methods:

AASHTO T 65 Standard Method of Test for Mass [Weight] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings

Noncompliant Material and Price Adjustment: Noncompliant material is not accepted. Material is returned to the manufacturer and replaced with acceptable material. Price adjustments are not in place for this material.

340.05.07.02 Chain Link Wire.

Specifications:

AASHTO M 181 Standard Specification for Chain-Link Fence

Test Methods:

AASHTO T 65 Standard Method of Test for Mass [Weight] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings

Noncompliant Material and Price Adjustment: Noncompliant material is not accepted. Material is returned to the manufacturer and replaced with acceptable material. Price adjustments are not in place for this material.

340.05.07.03 Gabion Fence.

Specifications:

ASTM A1064 Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete

Test Methods:

ASTM A90 Standard Test Method for Weight (Mass) of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings

Noncompliant Material and Price Adjustment: Noncompliant material is not accepted. Material is returned to the manufacturer and replaced with acceptable material. Price adjustments are not in place for this material.

340.05.07.04 Gabion Fence Tie Wire and Connecting Wire.

Specifications:

ASTM A641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire

Noncompliant Material and Price Adjustment: Noncompliant material is not accepted. Material is returned to the manufacturer and replaced with acceptable material. Price adjustments are not in place for this material.

340.05.07.05 Silt Fence.

Specifications:

ASTM A116 Standard Specification for Metallic-Coated, Steel Woven Wire Fence Fabric

Noncompliant Material and Price Adjustment: Noncompliant material is not accepted. Material is returned to the manufacturer and replaced with acceptable material. Price adjustments are not in place for this material.

340.05.07.06 Steel Fence Posts and Assemblies for Woven Wire and Barb Wire Fences.
Specifications:

AASHTO M 281 Standard Specification for Steel Fence Posts and Assemblies, Hot-Wrought

Noncompliant Material and Price Adjustment: Noncompliant material is not accepted. Material is returned to the manufacturer and replaced with acceptable material. Price adjustments are not in place for this material.

340.05.07.07 Steel Fence Posts or Braces for Chain Link Fences.

Specifications:

AASHTO M 181	Standard Specification for Chain-Link Fence
AASHTO M 281	Standard Specification for Steel Fence Posts and Assemblies, Hot-Wrought
ASTM F 1043	Standard Specification for Strength and Protective Coatings on Steel Industrial Fencing

Noncompliant Material and Price Adjustment: Noncompliant material is not accepted. Material is returned to the manufacturer and replaced with acceptable material. Price adjustments are not in place for this material.

340.05.07.08 Tension Wire and Accessories and Hardware.

Specifications:

AASHTO M 181	Standard Specification for Chain-Link Fence
ASTM A116	Standard Specification for Metallic-Coated, Steel Woven Wire Fence Fabric

Test Methods:

AASHTO T 65	Standard Method of Test for Mass [Weight] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings
ASTM E8	Standard Test Methods for Tension Testing of Metallic Materials

Noncompliant Material and Price Adjustment: Noncompliant material is not accepted. Material is returned to the manufacturer and replaced with acceptable material. Price adjustments are not in place for this material.

340.05.07.09 Woven Wire.

Specifications:

AASHTO M 279	Standard Specification for Metallic-Coated Steel Woven Wire Fence Fabric

Test Methods:

AASHTO T 65	Standard Method of Test for Mass [Weight] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings

Noncompliant Material and Price Adjustment: Noncompliant material is not accepted. Material is returned to the manufacturer and replaced with acceptable material. Price adjustments are not in place for this material.

340.05.08 Fly Ash.

Sample Frequency: According to the Idaho Quality Assurance Manual.

Specifications:

AASHTO M 295	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete

Test Methods:

AASHTO T 105	Standard Method of Test for Chemical Analysis of Hydraulic Cement
ASTM C311	Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use as a Mineral Admixture in Portland-Cement Concrete

Noncompliant Material and Price Adjustment: Noncompliant material is not accepted. The product is returned to the manufacturer and replaced with acceptable material. The limits of Available Alkalies do not apply to fly ash used as a mineral admixture.

If product cannot be returned, the following price adjustments are recommended:

Class F Fly Ash used as ASR Mitigation

Available Alkali Content (1.5% Maximum)

Available Alkalis (%)	Supplier	Price Adjustment
Greater than 1.5%	Approved	50% of Fly Ash
Greater than 1.5%	Non-Approved	25% of Contract Item

Calcium Oxide Content (Maximum of 11%)

Calcium Oxide (%)	Supplier	Aggregate Source	Price Adjustment
Greater than 12% but less than 13%	Approved	Reactive	50% of Fly Ash
Greater than 13%	Approved	Reactive	25% of Contract Item
Greater than 12%	Non-Approved	Reactive	25% of Contract Item

Loss on Ignition Content (1.5%)

Loss on Ignition (%)	Supplier	Price Adjustment
Greater than 1.5%	Approved	50% of Fly Ash
Greater than 1.5%	Non-Approved	25% of Contract Item

Class F Fly Ash used as a Mineral Admixture

Calcium Oxide Content (15% Maximum)

Calcium Oxide (%)	Supplier	Price Adjustment
Greater than 16% but less than 17%	Approved	25% of Fly Ash
Greater than 17%	Approved	25% of Contract Item
Greater than 16%	Non-approved	25% of Contract Item

Loss on Ignition Content (1.5%)

Loss on Ignition (%)	Supplier	Price Adjustment
Greater than 1.5%	Approved	50% of Fly Ash
Greater than 1.5%	Non-Approved	25% of Contract Item

340.05.09 Glass Beads.

Sample Frequency: According to the Idaho Quality Assurance Manual.

Specifications:

FSTM TT-B-1325D* Federal Specification Beads, (Glass Spheres), Retro-Reflective

AASHTO M 247 Standard Specification for Glass Beads Used in Traffic Paints

Idaho Transportation Department Specifications for Dual Chemically Coated Glass Spheres (Beads) for Water Borne Traffic Line Paint

Test Methods	Description
ASTM D1155	Specification Test Method for Roundness of Glass Spheres
ASTM D1214	Specification Test Method for Sieve Analysis of Glass Spheres
FSTM TT-B-1325D*	Federal Specification Beads, (Glass Spheres), Retro-Reflective
Special IDAHO Test*	Adherence and Anti-Wetting Coating Tests

Noncompliant Material and Price Adjustment: Noncompliant material is not accepted. The product is returned to the manufacturer and replaced with an acceptable product. Price adjustments are not in place for this material.

***See Chemistry Central Laboratory Personnel for current Method Procedures.**

340.05.10 Latex Modifier.

Sample Frequency: According to the Idaho Quality Assurance Manual.

Specifications:

Test Method:

Idaho IT-121	Standard Method of Test for Determining Total Solids-Latex, Percent

Noncompliant Material and Price Adjustment: Noncompliant material is not accepted. The product is returned to the manufacturer and replaced with an acceptable product. Price adjustments are not in place for this material.

340.05.11 Lime/Quicklime Products.

Sample Frequency: According to the Idaho Quality Assurance Manual.

Specifications:

ASTM C977	Standard Specification for Quicklime and Hydrated Lime for Soil Stabilization

Test Methods:

ASTM C25	Standard Test Methods for Chemical Analysis of Limestone, Quicklime, and Hydrated Lime
ASTM C110	Standard Test Methods for Physical Testing of Quicklime, Hydrated Lime, and Limestone

Noncompliant Material and Price Adjustment: Noncompliant material is not accepted. The product is returned to the manufacturer and replaced with an acceptable product. Price adjustments are not in place for this material.

340.05.12 Structural Paint (All Formulas).

Sample Frequency: According to the Idaho Quality Assurance Manual or Department contract.

Formula No. 1	Primer, Inorganic Zinc Rich
Formula No. 2	Primer, Organic Zinc Rich
Formula No. 3	Primer, Zinc Rich Moisture-Cure Polyurethane
Formula No. 4	Primer, High Solids Polyamide Epoxy
Formula No. 5	Intermediate, High Solids Polyamide Epoxy
Formula No. 6	Intermediate, Moisture-Cured Polyurethane, Micaceous Iron Oxide Reinforced, Performance Based
Formula No. 7	Topcoat, High Solids Polyamide Epoxy
Formula No. 8	Topcoat, High Solids Aliphatic Polyurethane
Formula No. 9	Topcoat, Aliphatic Moisture-Cured Polyurethane
Formula No. 10	Micaceous Iron Oxide – Aluminum, Moisture-Cured Polyurethane
Formula No. 11	Primer, Latex, Exterior
Formula No. 12	Primer, Latex, Exterior, Semi-Gloss
Formula No. 13	Concrete Stain, Flat
Formula No. 14	Highway Traffic Line Paint, Latex

Specifications:

ASTM D520 (Type II) Standard Specification for Zinc Dust Pigment

SSPC Paint 20 Type I-C and Type II

SSPC Paint 27, 22, 36, 38, 40 & 41

TT-P-19 Federal Specification

TT-P-1984 Federal Specification

Test Methods	Description
ASTM D562	Standard Test Method for Consistency of Paints Measuring Krebs Unit (KU) Viscosity Using a Stormer-type Viscometer
ASTM D823	Standard Practices for Producing Films of Uniform Thickness of Paint, Varnish, and Related Products on Test Panels
ASTM D968	Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive
ASTM D1005	Standard Practices for Measurement of Dry-Film Thickness of Organic Coatings Using Micrometers
ASTM D1475	Standard Test Method for Density Liquid Coatings, Inks, and Related Products
ASTM D2369	Standard Test Method for Volatile Content of Coatings
ASTM D2486	Standard Test Methods for Scrub Resistance of Wall Paints
FTMS 4061.1	Standard Test Method for Drying Time of Coatings

Noncompliant Material and Price Adjustment: Material shall meet Idaho Transportation Department and Manufacturer's specifications. Noncompliant material is not accepted. The product is returned to the manufacturer and replaced with an acceptable product. Price adjustments are not in place for this material.

340.05.13 Durable Markings (Epoxy, High Performance Tape, Methyl Methacrylate, Polyurea, Thermoplastic, etc.).

Sample Frequency: According to the Idaho Quality Assurance Manual or Department contract.

Specifications:

AASHTO M 249	Standard Specification for White and Yellow Reflective Thermoplastic Striping Material (Solid Form)

Test Methods:

ASTM D823	Standard Test Practices for Producing Films of Uniform Thickness of Paint, Varnish, and Related Products on Test Panels
ASTM D4061	Standard Test Method for Retroreflectance of Horizontal Coatings

Noncompliant Material and Price Adjustment: Material shall meet Idaho Transportation Department and Manufacturer's specifications. Noncompliant material is not accepted. The product is returned to the manufacturer and replaced with an acceptable product. Price adjustments are not in place for this material.

340.05.14 Waterborne Traffic Line Paint.

Sample Frequency: According to the Idaho Quality Assurance Manual or Department contract.

Specifications:

Specifications for White and Yellow Waterborne Traffic Line Paint Idaho Transportation Department

Test Methods	Description
ASTM D522	Standard Test Methods for Mandrel Bend Test of Attached Organic Coatings
ASTM D562	Standard Test Method for Consistency of Paints Measuring Krebs Unit (KU) Viscosity Using a Stormer-Type Viscometer
ASTM D661	Standard Test Method for Evaluating Degree of Cracking of Exterior Paints
ASTM D711	Standard Test Method for No-Pick-Up Time of Traffic Paint
ASTM D823	Standard Practices for Producing Films of Uniform Thickness of Paint, Varnish, and Related Products on Test Panels
ASTM D868	Standard Practice for Determination of Degree of Bleeding of Traffic Paint.
ASTM D869	Standard Test Method for Evaluating Degree of Settling of Paint
ASTM D1005	Standard Test Method for Measurement of Dry Film thickness of organic Coatings using Micrometers
ASTM D1394	Standard Test Methods for Chemical Analysis of White Titanium Pigments
ASTM D1475	Standard Test Method for Density Liquid Coatings, Inks, and Related Products
ASTM D2243	Standard Test Method for Freeze-Thaw Resistance of Water-Borne Coatings
ASTM D2369	Standard Test Method for Volatile Content of Coatings
ASTM D2486	Standard Test Methods for Scrub Resistance of Wall Paints
ASTM D2805	Standard Test Method for Hiding Power of Paints by Reflectometry
ASTM D3723	Standard Test Method for Pigment Content of Water-Emulsion Paints by Low-Temperature Ashing
ASTM E70	Standard Test Method for pH of Aqueous Solutions with the Glass Electrode
ASTM E1347	Standard Test Method for Color and Color-Difference Measurement by Tristimulus (Filter) Colorimetry Using Micrometers
FTMS 4051.1	Standard Test Method for Vehicle Solids
FTMS 6131	Standard Test Method for Yellowness Index

Noncompliant Material and Price Adjustment: Price adjustments will be assessed on product cost, excluding freight. Determination of the price adjustment to be applied will be based on ITD Materials Laboratory testing procedures. Total price adjustments will not exceed 50% or complete rejection. The price adjustments will be based on the paint price F.O.B.

Density (lb/Gallon)

Density (plus or minus 0.20 lb/Gal)	Price Adjustment
Greater than 0.20 but less than or equal to 0.30 lb/Gal	25% of lot or batch number
Greater than 0.30 lb/Gal	50% or Rejection

Viscosity (Krebs Units)

Viscosity (85 to 95)	Price Adjustment
83 K.U. to 97 K.U.	None
80 K.U. to 82 K.U. or 98 K.U. to 100 K.U.	25% of lot or batch number
Less than 80 K.U. or Greater than 101 K.U.	50% or Rejection

Scrub Resistance (Cycles)

Scrub Resistance (800 cycles Minimum)	Price Adjustment
775 to 799	None
750 to 774	25% of lot or batch number
Less than 750	50% or Rejection

pH (standard units)

pH (9.8 Minimum)	Price Adjustment
9.7 to 9.8	None
9.5 to 9.6	25% of lot or batch number
Less than 9.5	50% or Rejection

340.05.15 Silica Fume.

Sample Frequency: According to the Idaho Quality Assurance Manual or Department contract.

Specifications:

AASHTO M 307 Standard Specification for use of Silica Fume as a Mineral Admixture in Hydraulic-Cement Concrete, Mortar, and Grout

Test Methods	Description
AASHTO T 105	Standard Method of Test for Chemical Analysis of Hydraulic Cement
ASTM C311	Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use as a Mineral Admixture in Portland-Cement Concrete
ASTM C430	Standard Test Method for Fineness of Hydraulic Cement by the 45-um (No. 325) Sieve
ASTM C1240	Standard Specification for Silica Fume Used in Cementitious Mixtures

Noncompliant Material and Price Adjustment**:** Noncompliant material is not accepted. The product is returned to the manufacturer and replaced with an acceptable product.

Available Alkali Content (1.5% Maximum)

Available Alkali (1.5% Maximum)	Price Adjustment
Greater than 1.5%	25% of Silica Fume

Retained when wet-sieved on the #325 Screen (10% Maximum)

#325 Screen (10% Maximum)	Price Adjustment
Greater than 10%	25% of Silica Fume

340.05.16 Reserved.

340.05.17 Water for Concrete, Grout, and Mortar.

Sample Frequency: According to the Idaho Quality Assurance Manual.

Specifications:

Standard Specification for Highway construction

Test Methods	Description
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D512	Standard Test Methods for Chloride Ion in Water
ASTM D516	Standard Test Method for Sulfate Ion in Water
ASTM D1125	Standard Test Methods for Electrical Conductivity and Resistivity of Water
ASTM D1293	Standard Test Methods for pH of Water

Noncompliant Material and Price Adjustment: Noncompliant material is not accepted. Another source of water for concrete is located, sampled, and tested for compliance. Price adjustments are not in place for this material.

340.05.18 Hazardous Materials and Waste

Sample Frequency: As required.

Specifications:

EPA Guidelines

Test Methods:

EPA Guidelines*

USDA Soil Method 24* Diagnosis and Improvement of Saline and Alkali Soils

Noncompliant Material and Price Adjustment: Not applicable.

***See Chemistry Central Laboratory Personnel for current Method Procedures.**

340.05.19 Used Lubricating and Hydraulic Oils.

Sample Frequency: According to ITD's Preventative Maintenance Program.

Specifications:

According to ITD's Preventative Maintenance Program.

Test Methods:

Test Methods	Description
ASTM D445	Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity)
ASTM E1252	Standard Practice for General Techniques for Obtaining Infrared Spectra for Qualitative Analysis
ASTM D4206	Standard Test Method for Sustained Burning of Liquid Mixtures Using the Small Scale Open-Cup Apparatus
ASTM D6595	Standard Test Method for Determination of Wear Metals and Contaminants in Used Lubricating Oils or Used Hydraulic Fluids by Rotating Disc Electrode Atomic Emission Spectroscopy

Testing Tolerances: According to laboratory-determined acceptable ranges.

Noncompliant Material and Price Adjustment: Not applicable.

SECTION 350.00 ASPHALT BINDER LABORATORY

The Asphalt Binder Laboratory is responsible for testing the quality of all bituminous products for highway construction projects and maintenance projects.

350.01 Testing Procedures. Bituminous samples received by the Asphalt Binder Laboratory for testing fall within three general types:

1. Performance Graded Binders
2. Emulsified Asphalt
3. Special Products (e.g., Crack Filler, Bituminous Coatings, Anti-Strip Additive Approval, etc.)

350.01.01 Performance Graded Binders. Testing of Performance Graded Binders consists of the following tests found in AASHTO Standards and Idaho Test Methods.

Table 350.01.01.1: PG Binder Methods

Test Methods	Description
T 48	Standard Method of Test for Flash and Fire Points by Cleveland Open Cup
T 316	Standard Method of Test for Viscosity Determination of Asphalt Binder Using Rotational Viscometer
T 315	Standard Method of Test for Determining the Rheological Properties of Asphalt Binder Using a Dynamic Shear Rheometer (DSR)
T 240	Standard Method of Test for Effect of Heat and Air on a Moving Film of Asphalt Binder (Rolling Thin-Film Oven Test)
R 28	Standard Practice for Accelerated Aging of Asphalt Binder Using a Pressurized Aging Vessel (PAV)
T 313	Standard Method of Test for Determining the Flexural Creep Stiffness of Asphalt Binder Using the Bending Beam Rheometer (BBR)
T 301	Standard Method of Test for Elastic Recovery Test of Asphalt Materials by Means of a Ductilometer
IT-99	Detection of Anti-Stripping Additive in Asphalt
IT-137	Effectiveness of Anti-Strip Agents After Hot Storage in Asphalt Binder Using Bottle and Sand

350.01.02 Anti-Strip Additives. Anti-strip additives are accepted for use on Department projects only when pre-approved by Central Asphalt Binder Laboratory and placed on the QPL. The products are tested according to IT-137 and IT-99. The State reserves the right to conduct additional testing on materials if required to determine acceptance.

Field testing for the presence of anti-strip is performed in accordance with the ITD Quality Assurance Manual.

350.01.03 Emulsified Asphalt. Emulsified asphalt is divided into three groups.

350.01.03.01 Seal Coat Emulsions (CRS-2, CRS-2R, CRS-P, etc.) Seal Coat Emulsions are tested in conjunction with District Seal Coat Field Viscosity Testing (IT-61). All samples, whether field tested or not, are sent to the Central Laboratory. If samples have been field tested, the Central Laboratory will perform the following AASHTO tests.

Test Methods	Description
T 59*	Residue by Evaporation
T 59 and 72	Consistency Test (Saybolt Viscosity at 50°C or 122°F)
T 49	Penetration on Residue
T 301	Elastic Recovery
CTM 332	Torsional Recovery (California Test Method)

* Modify the Evaporation Test for T 59 as follows:

- Cook the 50 gram samples of emulsion on a hot plate until all foaming is finished.
- Follow with an oven treatment at 325^{o}F for one hour.

NOTE: If viscosity has not been performed in the field, the Central Laboratory will test for Viscosity (AASHTO T 59, or AASHTO T 72). All attempts will be made to perform viscosities within 30 days of the day of sampling. When the workload becomes heavy and there are two or more samples representing the same delivery ticket number, only one of these samples needs to be tested. If the sample passes, all samples representing the delivery ticket will be considered acceptable.

350.01.03.02 Tack Coats and Fog Seals (CSS-1, SS-1, etc.)

Tack Coat and Fog Seal Emulsion testing will include the following AASHTO tests.

Test Methods	Description
T 59 and T 72	Consistency Test (Saybolt Viscosity at 25°C or 77°F)
T 59*	Residue by Evaporation
T 49	Penetration of Residue
T 301	Elastic Recovery
CTM 332	Torsional Recovery (California Test Method)

* Modify the Evaporation Test for T 59 as follows:

- Cook the 50 gram samples of emulsion on a hot plate until all foaming is finished.

- Follow with an oven treatment at 325°F for one hour.

350.01.03.03 Cold Mix Recycle Emulsions (CMS-2, CMS-2s, etc.)

Cold Mix Recycle Emulsion testing will include the following AASHTO tests.

Test Methods	Description
T 59 and 72	Consistency Test (Saybolt Viscosity at 50°C or 122°F)
T 59*	Residue by Evaporation
T 49	Penetration of Residue
T 301	Elastic Recovery
CTM 332	Torsional Recovery (California Test Method

* Modify the Evaporation Test for T 59 as follows:

- Cook the 50 gram samples of emulsion on a hot plate until all foaming is finished.
- Follow with an oven treatment at 325°F for one hour.

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350.02 Testing Tolerances and Price Adjustments. The following sections give the values for testing tolerances and the price adjustment required if the asphalt samples are not within the tolerance range.

350.02.01 Performance Graded Binders.

Table 350.02.01.1 Performance Graded Binder Testing Tolerance and Price Adjustment

Test Method	Deviation % of Spec Value	Price Adjustment
AASHTO T 48 Flash Point C.O.C. (230°C minimum 450°F)	0 to 8.4	0%
	8.5 to 16.4	10%
	16.5 +	25%
AASHTO T 316 Brookfield Viscosity (3 Pa·S. maximum)	0 to 10.4	0%
	10.5 to 20.4	10%
	20.5 +	25%
AASHTO T 15 Dynamic Shear – Original (1.0 kPa minimum)	0 to 10.4	0%
	10.5 to 20.4	10%
	20.5 +	25%
AASHTO T 15 Dynamic Shear -Rolling Thin Film Residue (2.2 kPa minimum)	0 to 10.4	0%
	10.5 to 20.4	10%
	20.5 +	25%
AASHTO T 15 Dynamic Shear – PAV Residue (5000 kPa maximum)	0 to 10.4	0%
	10.5 to 20.4	10%
	20.5 +	25%
AASHTO T 240 Rolling Thin Film Oven Test (1.0% maximum loss)	0 to 20.4	0%
	20.5 to 40.4	10%
	40.5 +	25%
AASHTO T 313 Bending Beam (Stiffness, 300 MPa maximum)	0 to 5.4	0%
	5.5 to 10.4	10%
	10.5 +	25%
AASHTO T 313 Bending Beam (Slope, m-Value 0.300 minimum)	0 to 5.4	0%
	5.5 to 10.4	10%
	10.5 +	25%
AASHTO T 301 Elastic Recovery (50% minimum at 25°C)	0 to 5.4	0%
	5.5 +	25%

Noncompliant Material and Price Adjustment: Price adjustments will be assessed on product cost, excluding freight. Determination of the price adjustment to be applied will be based on ITD Materials Laboratory testing procedures. Total price adjustments will not exceed 50% or complete rejection. The price adjustments will be based on the binder price F.O.B.

Out-of-specification performance graded binder will be assessed a price adjustment based on the Contractor's supplier price. The PG Binder will be clearly identified by verification unit and price reduction will be assessed on the entire lot.

350.02.02 Anti-Strip Additives. Field testing for the presence of anti-strip is performed at the project site in accordance with the ITD Quality Assurance Manual. If plant mix is placed without anti-strip or with failing anti-strip results, then the following price adjustment will apply.

Note: Failing IT-99 field test results for anti-strip can be sent to the Central Laboratory for acceptance using a modified IT-137 test method where the anti-strip additive and the 96-hour hot storage is not conducted. The sample will be heated, mixed uniformly, and tested. The results on the modified IT-137 test will confirm the presence or absence of an effective amount of anti-strip additive being contained in the asphalt binder.

Deviation	Price Adjustment on Mix Placed
Negative	25%

350.02.03 Emulsified Asphalt.

Table 350.02.03.1: Emulsified Asphalt Testing Tolerance and Price Adjustment

Test Method	Deviation % of Spec Value		Price Adjustment
AASHTO T 59 Saybolt Viscosity	25°C (77°F)	50°C (122°F)	—
	0 to 15.4	0 to 21.4	0%
	15.5 to 30.4	21.5 to 42.4	15%
	30.5 +	42.5 +	25%
AASHTO T 59 Residue by Evaporation	0 to 1.4		0%
	1.5 to 2.4		15%
	2.5 +		25%
AASHTO T 49 Penetration of Residue	Below Minimum		—
	0 to 16.4		0%
	16.5 to 24.4		15%
	24.5 +		25%
	Above Maximum		—
	0 to 8.4		15%
	8.5 +		25%
AASHTO T- 301 Elastic Recovery	Below Minimum		—
	0 to 5.4		0%
	5.5 +		25%
CTM 332 Torsional Recovery	Below Minimum		—
	0 to 5.4		0%
	5.5 +		25%

When a failure occurs, any remaining samples representing that delivery ticket number must be tested. A price adjustment will be based on the contractor's supplier price.

350.03 Noncompliant Material and Price Adjustment Letters. In the event of a failing asphalt test result, repeat the test. If the sample fails on retest, report the average of the two test results. Failing samples are retained in the laboratory for one year. If the sample passes specifications upon retest, report the sample as passing.

350.04 Asphalt Price Adjustment Letters. When submitting a report that includes out-of-specification material, a Price Adjustment Letter will be sent to the District Engineer. The letter will include only one of the supplier's failures.

SECTION 360.00 STRUCTURES & CEMENT LABORATORY

360.01 Structures Laboratory. The Structures Laboratory tests the physical and mechanical properties of concrete, steel, and fasteners related to statewide construction. The testing may be performed in the laboratory or in the field using destructive and/or nondestructive testing methods.

360.02 Cement Laboratory. The cement laboratory performs physical testing of cementitious materials. Cement is tested for specific properties designated by AASHTO and ASTM to ensure quality and consistency of the product.

360.03 Inspection of Pre-cast Concrete. Personnel from the Structures Laboratory perform inspection of precast concrete components (e.g., girders, slabs, stiff legs, pipe, wall panels, decks, and structures). This inspection is performed in-state and out-of-state for Department projects. Inspection is performed in accordance with project requirements, Standard Specifications for Highway Construction, and the Precast Concrete Institute (PCI). The inspection may also be assigned to ITD District personnel or contracted to consultants or other state DOT personnel. Testing must be performed in accordance with AASHTO and ASTM requirements.

360.04 Verification of Portable Scales. The Structures Laboratory performs biannual load verification of portable scales for the Port-of-Entry (POE), County Sheriff, and Boise Police. A universal test machine, which is certified by NIST standards annually, is used to verify the portable scales. Scale certification is performed in accordance with Handbook 44 for Weight and Measurement Devices.

360.05 Steel Reinforcement Testing. The Structures Laboratory is responsible to perform all acceptance or verification strength testing for steel reinforcement products, including metal reinforcing bar, steel strand, dowel bars, bolts, etc.

The test results are immediately emailed to the project staff and subsequently posted to the ITD intranet Central Laboratory page. A failing test will require an additional sample. Failing material is rejected and removed from the project.

360.06 Testing of Material. Materials used in highway construction must comply with specified criteria as outlined in the ITD Standard Specifications for Highway Construction. The majority of the testing performed in the Structures Laboratory can be found in Standard Specification Subsections 409, 502, 506, and 703. The majority of the tests performed are AASHTO Test Methods; however, there are some ASTM and Idaho Test methods being utilized.

The following information is a complete listing of tests that are currently being used in the Structures Laboratory. Test methods are AASHTO unless otherwise noted.

360.06.01 Cement.

Test Methods	Description
Idaho IR-143	Sampling
AASHTO T 162	Mechanical Mixing
AASHTO T 106	Compressive Strength
AASHTO T 107	Autoclave Expansion
AASHTO T 129	Normal Consistency
AASHTO T 131	Time of Set (Vicat)
AASHTO T 133	Specific Gravity
AASHTO T 137	Air Content
AASHTO T 153	Fineness of Hydraulic Cement by Air Permeability Apparatus
AASHTO T 162 & AASHTO T 186	False Set (Paste Method)
AASHTO M 152	Flow Table & Caliper

360.06.02 Concrete Aggregate.

Test Methods	Description
FOP for AASHTO T 2	Sampling
AASHTO T 19	Unit Weight
AASHTO T 21	Organic Impurities
FOP for AASHTO T 27	Sieve Analysis
Idaho IT-13	Mortar Strength
FOP for AASHTO T 84	Specific Gravity, FA
FOP for AASHTO T 85	Specific Gravity, CA
AASHTO T 96	L.A. Wear, CA
FOP for AASHTO T 176	Sand Equivalent

360.06.03 Concrete.

Test Methods	Description
AASHTO T 22	Compressive Strength
AASHTO T 24	Obtaining & Testing Cores
FOP for AASHTO T 119	Slump
FOP for AASHTO T 121	Unit Weight, Fresh
AASHTO R 39	Laboratory Produced Concrete
AASHTO T 141	Sampling Fresh Concrete
FOP for AASHTO T 152	Air Content, Pressure Method
AASHTO T 231	Capping Concrete Cylinders
AASHTO R 39	Mix Design, Absolute Volume

360.06.04 Steel for Concrete Reinforcement.

Test Methods	Description
AASHTO T 68 & T 244	Deformed Billet – Steel Bars
AASHTO T 68 & T 244	Cold Drawn Steel Wire
AASHTO T 68 & T 244	Welded Wire Fabric
AASHTO T 68 & T 244	Uncoated Seven-Wire Strand
AASHTO T 68 & T 244	Uncoated Stress Relieved Wire
AASHTO T 68 & T 244	High Strength Alloy Bars
AASHTO T 68 & T 244	Carbon Steel Bars, Plain Round

360.06.05 Steel Plate Fasteners.

Test Methods	Description
AASHTO T 68 & T 244	Hi-Strength Bolts
RC Assembly	Hi-Strength Nuts
RC Assembly	Hardened Washers
RC Assembly	DTIs (Direct Tension Indicators)
AASHTO T 80	Rockwell Hardness

360.06.06 Building Block Materials.

Test Methods	Description
ASTM C67	Blocks & Bricks
ASTM C144 and C404	Mortar & Grout Aggregate
ASTM C91	Mortar
ASTM C939	Flow or Grout

360.06.07 Joint Filler.

Test Method	Description
AASHTO T 42	Sampling & Testing Joint Filler

Section 400.00 – ITD Nuclear Gauge Program

The administration of the nuclear gauge program is handled through the Central Laboratory. A person within the laboratory who is qualified as a Radiation Safety Officer (RSO) will manage this program statewide and act as a liaison with the Nuclear Regulatory Commission (NRC). The RSO will ensure that all personnel required to operate nuclear equipment will be trained in the safe handling and proper usage of nuclear equipment according to the policies and regulations set by the NRC. Trained personnel shall be provided with the proper equipment to perform their duties. Districts, operators, and equipment will be monitored on a routine basis for conformance to policies and regulations. Failure to comply could result in substantial penalties and fines to the Department as well as the individual.

SECTION 410.00 – ITD HQ Central Laboratory

The Central Laboratory will carry the license, provide policies and regulations, and maintain a line of communication with the NRC.

The Central Laboratory will administer and fund a program monitoring personal exposure to radiation, (i.e., personal dosimetry) as well as provide, administer, and fund a leak testing program.

The Central Laboratory will review nuclear gauge operator certifications every quarter. Only qualified operators will receive TLDs (Thermo-Luminescent Dosimeters) for the quarter. This will ensure that TLDs are only distributed to operators who have current certifications.

The Central Laboratory will assign gauges to districts and conduct a gauge inventory every six months, or as requested, and provide a depot with storage for gauges that require repair or recalibration.

The Central Laboratory will:

- Maintain records on:
    - Personnel
    - Training
    - Dosimeters
    - Gauges
- Provide:
    - Personnel exposure records to District RSO's
    - Certification cards to qualified operators

The ITD RSO will conduct an audit in each District at least once per year and record the findings of the audit to comply with NRC requirements.

The Central Laboratory will oversee the procurement, funding of new gauges, and disposal of density gauges according to NRC regulations.

SECTION 420.00 – ITD District Materials Laboratories

Each ITD District Materials Engineer will assign at least one person to obtain required training and become qualified as the District RSO. The District RSO's duties include:

- Receive TLDs from HQ Central Laboratory for distribution to operators as necessary
- Collect TLDs each quarter and return them to the HQ Central Laboratory for evaluation
- Provide exposure records to gauge operators and distribute certification cards as required
- Maintain a permanent nuclear density gauge storage area
- Assign nuclear density gauges to residencies as needed
- Provide shipping papers and documents
- Ensure that nuclear devices are being used safely, transported correctly, and TLDs worn during gauge use
- Perform wipe tests on nuclear devices as requested
- Conduct an audit on randomly selected operators several times per year and provide results to the HQ Central Laboratory RSO

SECTION 430.00 – ITD District Residencies

Residencies will assign nuclear density gauges to qualified operators/projects with provisions for temporary storage sites, when necessary, and document the location. In addition, they will ensure proper use of nuclear devices and see that each user has a certification card, TLD, proper shipping papers, and a properly secured and labeled nuclear density gauge.

SECTION 440.00 – Required Training

The ITD RSO will monitor essential training to ITD personnel within the program.

440.01 ITD RSO. The ITD RSO is required to attend a 40-hour training class approved by the NRC.

440.02 District RSOs. Persons at the District Level must attend the NRC-approved, 8-hour RSO class in order to qualify for the position of District RSO or Assistant District RSO.

440.03 Gauge Operators. Required classes include the following:

- An 8-hour Nuclear Gauge Certification Class (NRC approved).
- Gauge operator classes or on-the-job training.
- Refresher classes every two years.

Refresher classes may be instructed by state personnel familiar with the subject matter, such as the ITD RSO or a District RSO. Information presented must cover regulatory compliance, transportation, personal monitoring, emergency response, and general safety with radioactive materials.

SECTION 450.00 – Required Forms

The following list of forms will be used where required for compliance to the ITD Nuclear Gauge Program:

- ITD-804 Certificate of Training for Transportation of Nuclear Devices
- ITD-817 Nuclear Program Audit
- ITD-823 Nuclear Gauge Inventory Record
- ITD-824 Shippers' Certification for Radioactive Materials
- ITD-825 Nuclear Gauge Inventory Record
- ITD-863 Nuclear Gauge Dispatch Log
- ITD-864 TLD Personnel List – Nuclear Program
- ITD-866 Wipe Test Kit for Nuclear Density Gauge (Internal & Rod Source)

SECTION 500.00 STANDARD METHODS AND PRACTICES

Refer to the Quality Assurance Manual for Idaho Standard Practices (IR), Idaho Standard Method of Tests (IT), WAQTC/Idaho Field Operating Procedures, Idaho Field Operating Procedures, and ITD Sampler/Tester Qualification Program.