



LC-101

Asphalt and Aggregate Laboratory and Technician

Certification Programs

This document has been issued by the CCIL Certification Office and has been approved by the Asphalt and Aggregates Certification Program Administration Committees (CPAC).

Any inquiries about the document can be directed to:

Certification Program Manager
3410 South Service Road, Suite 104
Burlington, ON
L7N 3T2
Tel: 289.337.8888
Fax: 289.337.8889
gkermath@ccil.com

Copies of the manual are available on request from the CCIL Certification Office.

COPYRIGHT

The CCIL Certification Office holds the copyright of this document and it may not be copied for resale.

Table of Contents

1.0	Introduction	5
1.1	Background	5
1.2	Reference Material	5
1.3	Definitions	5
1.4	Laboratory Categories	6
2.0	Responsibilities of the CCIL Board of Directors	6
3.0	Responsibilities of the Executive Committee of the CCIL Board of Directors	6
4.0	Certification Program Administration Committees (CPACs)	6
4.1	General	6
4.2	Duties and responsibilities of CPAC	6
4.3	Composition of the Asphalt and Aggregates CPAC(s)	7
5.0	Certification Program Manager	7
5.1	General Duties	8
5.2	Certification Decisions	8
5.3	Annual Inter-Laboratory Correlation Testing Program	8
5.4	Laboratory Inspections Program	9
5.5	Confidentiality of the Program	9
5.6	Conflicts of Interest	9
6.0	Requirements for Certification	9
6.1	Specific Laboratory Certification Requirements	9
6.2	Laboratory Compliance Report	10
6.3	Organization, Management & Personnel	10
6.3.1	Organization	10
6.3.2	Management	10
6.3.3	Personnel	11
6.4	Quality Management Systems	11
6.5	Equipment, Records and On-site Checks	11
6.5.1	Equipment	11
6.5.2	Records	11
6.5.3	On-site Checks	11
6.6	Facilities & Environment	11
6.7	Calibration and Traceability	12
6.7.1	Calibration	12
6.7.2	Traceability	12
6.8	Sub-contracting	12
6.9	Guidelines for Responsibilities and Duties	12
6.9.1	Guidelines	12
6.10	Annual Report	13
6.11	Laboratory Re-location or Sale of Facilities	13
7.0	Suspension and Withdrawal of Certification and Appeals and Disputes of Certification Decisions	13
8.0	Laboratory Technician Certification Programs	14

8.1	Background	14
8.2	Responsibilities and Duties	15
8.3	Specific Technician Certification Requirements	15
9.0	Complaints	15
10.0	Use of the CCIL Logo	15
A-1	Certification Program Requirements List of Appendices	16
A-2	Asphalt Mix Compliance Laboratories - Marshall Method (Type B)	17
A-3	Asphalt Mix Compliance Laboratories - Superpave Method (Type B)	20
A-4	Asphalt Mix Design Laboratories - Marshall Methods (Type A)	23
A-5	Asphalt Mix Design Laboratories - Superpave Methods (Type A)	27
A-6	Penetration Testing of Recovered Asphalt Cement (Type E)	32
A-7	Performance Graded Asphalt Cement Laboratories (Type F)	34
A-8	Aggregate Quality Control Laboratories (Type C)	37
A-9	Aggregate Physical Property Laboratories (Type D)	40
A-10	Asphalt and Aggregate Technician Certification	44

CCIL Asphalt and Aggregate Laboratory and Technician Certification Programs

1.0 Introduction

1.1 Background

1.1.1 The overall objective of inspecting and testing asphalt pavement materials i.e. Hot Mix Asphalt (HMA) and granular base is to determine whether their characteristics and qualities as used in construction, comply with applicable standards and specifications.

1.1.2 In response to an ever-increasing demand for reliability and reproducibility of test results in assuring the quality of asphalt pavements, the Canadian Council of Independent Laboratories (CCIL) manages and operates the CCIL Asphalt and Aggregates Laboratory and Technician Certification Programs.

1.1.3 The CCIL certification programs are open to all bituminous and aggregate testing laboratories providing design and/or quality control services for road construction through confirmation of laboratory conformance to the certification program requirements. Laboratories will be charged an annual fee to cover the overall costs involved.¹.

1.2 Reference Material²

- ISO/IEC 17025 – General requirements for the competence of testing and calibration laboratories. ²
- ISO/IEC Guide 2 Standardization and Related Activities - General Vocabulary

1.3 Definitions

- Laboratory: a workplace designated for scientific testing and analysis having all the necessary equipment, facilities and utilities.
- Permanent Laboratory: a laboratory located in a non-moveable structure on a fixed foundation.
- Mobile Laboratory: a laboratory located in a moveable trailer capable of being relocated, without a fixed foundation and usually connected to on-site utilities.
- Certification: to attest to meeting standards identified by CCIL Certification Program Administration Committee (CPAC) and CCIL Laboratory Certification documents.

1.4 Laboratory Categories

- Asphalt Mix Design - Type A (Marshall Method and/or Superpave Method)

1 The annual fees are determined by the CCIL Board of Directors

2 To obtain referenced documents or information pertaining to National and International Standards, contact:
Standards Information Services
Standards Council of Canada
55 Metcalfe Street, Suite 600, Ottawa, ON K1P 6L5 Canada

- Asphalt Mix Compliance – Type B (Marshall Method and/or Superpave Method)
- Penetration of Asphalt Cement Recovered from Hot Mix – Type E
- Performance Graded Asphalt Cement – Type F
- Aggregate Quality Control - Type C
- Aggregate Physical Properties – Type D
(Please see list in Appendix A-1)

2.0 Responsibilities of the CCIL Board of Directors

The Board of Directors of CCIL is responsible for the overall management of CCIL and approval of corporate wide procedures and policies.

3.0 Responsibilities of the Executive Committee of the CCIL Board of Directors

The Executive Committee is a four-member committee composed of the CCIL President, Vice President, Secretary/Treasurer, and the board member responsible for the certification programs. The committee is responsible for the overall administration of the asphalt and aggregates laboratory and technician certification programs and handling all disputes that arise from decisions on appeals. The Executive Committee is responsible for approval of the members of the CPACs and for determining the annual fees assessed to applicant and the certified laboratories. The Executive Committee, in consultation with the CPACs, shall have final judgement on all cases of potential conflicts of interest that have been referred to the Executive Committee by CPAC.

4.0 Certification Program Administration Committees (CPACs)

4.1 General

4.1.1 The Asphalt and Aggregates CPACs report to the Executive Committee and provide technical support for the operation of the Asphalt and Aggregate Laboratory and Technician Certification Programs. Membership of the CPAC as well as changes in the existing CPAC membership are approved by the Executive Committee and reflects the geographic aspect of the program.

4.1.2 The mandate of the CPACs is to establish and direct the technical elements of the Certification Programs. The operations and management of the Asphalt and Aggregate Laboratory and Technician Certification Programs is administered by CCIL's Certification Program Manager. The CPACs provide technical direction to the Certification Program Manager for delivering the programs.

4.2 Duties and responsibilities of CPAC

4.2.1 The Asphalt and Aggregates CPAC is responsible for the approval of all policies and procedures related to the technical requirements of the Asphalt and Aggregate laboratory and Technician Certification Programs.

4.2.2 The Asphalt and Aggregates CPACs address all potential conflicts of interest as identified by the Certification Program Manager and refer the issues to the Executive Committee as necessary.

4.2.3 The Asphalt and Aggregates CPACs are responsible to convene a subcommittee to hear any appeals by laboratories on certification decision made by the CCIL Certification Office.

4.2.4 The Asphalt and Aggregates CPACs monitor an on-going laboratory audit program as conducted by the Certification Program Manager. The Asphalt and Aggregates CPACs reviews the reports from the Certification Program Manager including actions taken by the Certification Program Manager in cases of a laboratory's non-conformance to certification requirements. In cases of continued non-conformance by the laboratory resulting from an on-site inspection or a complaint, a recommendation for withdrawal of certification is made by the Certification Program Manager for approval by the CPACs.

4.2.5 The Asphalt and Aggregates CPACs are responsible to discuss and approve the recommendations of the Certification Program Manager for the mini correlations to various laboratories, as appropriate.

4.2.6 The Asphalt and Aggregates CPACs are responsible to discuss and approve the recommendations of the Certification Program Manager for the laboratories to carry out the preparation of the correlation samples

4.3 Composition of the Asphalt and Aggregates CPAC(s)

4.3.1 The general structure of the Certification Program Administration Committees (CPAC) consists of the following:

- Three (3) CCIL members (including the chair),
- Two (2) Provincial Road Builder Association members,
- One (1) Ministry of Transportation representative
- One (1) Municipal Engineers Association representative

4.3.2 The Certification Program Manager and/or his designate attend the CPAC meetings. CCIL members and the road builder association members must be from firms that have construction materials testing laboratories and who have a responsibility in the operation of these laboratories. Separate CPAC committees can exist for Asphalt and Aggregates. Where separate Asphalt and Aggregate CPAC's exist, the road builder members should be from the division or allied association dealing specifically with Asphalt and Aggregates.

5.0 Certification Program Manager

The Certification Program Manager is retained by the CCIL. In carrying out his duties, the Certification Program Manager represents the CCIL and is responsible to the Certification Program Administration Committees (CPACs) for the following tasks:

5.1 General Duties

The Certification Program Manager has overall responsibility for the delivery of the certification programs administered by CCIL including the following:

- Manage the operation of the laboratory and technician certification programs.
- Provide reports to the CPACs on the Certification Programs
- Provide technical support and consultation to certified or applicant laboratories.

5.2 Certification Decisions

5.2.1 The Certification Program Manager is responsible for the decisions to carry out the Asphalt and Aggregates Certification Programs including those for granting or modifying certifications and suspension of certification. The Certification Program Manager is also responsible for making recommendations for withdrawal of certification to the CPACs.

5.2.2 The Certification Program Manager carries out his responsibilities in accordance with the certification program policies and procedures including “CCIL Procedure for Suspension, Withdrawal, Appeals and Disputes of Certification” and “CCIL Procedure for Handling Complaints”

5.3 Annual Inter-laboratory Correlation Testing Program

The Certification Program Manager:

- prepares the terms of reference and specifications for annual correlation sample preparation;
- evaluates and recommends the selection of laboratories to carry out the preparation of the correlation samples, to CPAC;
- oversees correlation sample preparation to ensure that it is in conformance with the specifications;
- oversees the quality assurance testing of the correlation samples to ensure that the samples are suitable for distribution to the applicant laboratories;
- oversees the distribution of the correlation samples to the applicant laboratories;
- provides a report to the CPAC of all aspects of the annual correlation sample preparation including comments from the laboratories, which participated in the preparation of the samples;
- receives, records, summarizes, evaluates and publishes the results of annual correlation testing program;
- based on the results of the annual correlation testing program, makes a decision regarding the certification of applicant laboratories;
- evaluates and recommends mini-correlation testing where appropriate;
- issues the mini correlation notifications to various laboratories as appropriate after discussion and approval by CPAC; and
- receives, records, summarizes and evaluates the results of mini-correlation testing and makes a decision regarding the certification of applicant laboratories.

5.4 Laboratory Inspection Program

5.4.1 An individual qualified in inspections and audits and reporting to the Certification Program Manager carries out laboratory inspections in accordance with the requirements established by the CCIL Certification Office. The requirements for the selection, training, approval and monitoring of inspectors are contained in the document “CCIL Procedure for the Selection, Training, Approval and Monitoring of Inspectors”.

5.4.2 Following the laboratory inspection, the Certification Program Manager or his/her designate prepares a written report for each laboratory confirming conformance or non-conformance with CCIL Laboratory Certification Program.

5.5 Confidentiality of the Certification Programs

5.5.1 All information pertaining to the Asphalt and Aggregates Laboratory and Technician Certification Program, except for the laboratory and technician certification information published on the CCIL website, are held in strict confidence between the laboratory involved, CCIL personnel, and the members of the CPACs.

5.5.2 The Certification Program Manager ensures that the confidentiality of the certification program is always maintained. Specifically, the Certification Program Manager ensures that the identities of the laboratories under discussion by the CPACs or Executive Committee are not known to the committee members. If a laboratory chooses to challenge a certification decision, through the appeals or dispute mechanism, the committees addressing the appeal or dispute are required to have access to sufficient information to make an informed decision.

5.6 Conflicts of Interest:

The Certification Program Manager brings all potential conflicts of interest to the attention of the CPACs at the earliest opportunity. The Chairs of the Asphalt and Aggregates CPACs will keep the Executive Committee apprised of all cases of reported conflicts of interest.

6.0 Requirements for Certification

Laboratories shall satisfy the various requirements as established by the CCIL Certification Office.

6.1 Specific Laboratory Certification Requirements

The specific requirements for the various laboratory certification categories are provided in the Appendices as listed below:

- Asphalt Mix Compliance Laboratory - Marshall Method (Type B): Appendix A-2
- Asphalt Mix Compliance Laboratory-Superpave Method (Type B): Appendix A-3
- Asphalt Mix Design Laboratory - Marshall Method (Type A): Appendix A-4
- Asphalt Mix Design Laboratory - Superpave Method (Type A): Appendix A-5
- Penetration Testing of Recovered Asphalt Cement (Type E): Appendix A-6
- Performance Graded Asphalt Cement (Type F): Appendix A-7

- Aggregate Quality Control Laboratory (Type C): Appendix A-8
- Aggregate Physical Property Laboratory (Type D): Appendix A-9
- Technician Certification: Appendix A-10

6.2 Laboratory Compliance Report

6.2.1 The laboratory shall agree to periodic laboratory inspections as required by the CCIL Certification Program Manager or his/her designate. The laboratory inspections verify conformance of laboratory operations with the program requirements. The operations reviewed in the laboratory inspection include, but are not limited to the following:

- Organization, management & personnel
- Internal quality systems
- Equipment
- Traceability & calibration
- Facilities and environment
- Sub-contracting

6.2.2 Inspections will take place when the laboratories are in operation. Disruption will be kept to a minimum and adequate notice will be provided to ensure that all key management and technical personnel are available and that testing can be viewed in progress. At the completion of the inspections, the Inspectors will provide the laboratories with a Conformance Report that outlines the results of the inspection.

6.2.3 Laboratory inspections have been set to provide for inspection for all new applicants as soon as possible in the first year with a minimum requirement of one inspection or subsequent audit for all participants every two years.

6.2.4 Laboratories to be inspected are scheduled by the Certification Program Manager or on the recommendation of the Certification Program Administration Committee (CPAC).

6.3 Organization, Management & Personnel

6.3.1 Organization

The laboratory shall be organized and operated in such a way that its designated permanent or mobile facilities meet the requirements of this document.

6.3.2. Management

The laboratory shall have available qualified management and technical staff in conformance with the appropriate sections of this document. This will include responsible engineering or equivalent management, supervisory personnel and technicians. Previously submitted staff resumes will be verified to ensure that they correspond to the personnel identified by management and that they are up-to-date. The Certification Program Manager must be advised of any equipment or staff changes during the certification period to allow verification that the Certificate of Conformance is still valid.

6.3.3 Personnel

Laboratories shall submit, with their annual application for the correlation program, an organizational chart for their firm identifying the key personnel for their testing section. CCIL certified laboratories are required to have at least one appropriately CCIL certified laboratory technician in the laboratory while it is in operation. More than one certified technician may be required by some agencies.

6.4 Quality Management Systems

The laboratory shall demonstrate the methods of ensuring on-going competence of its testing services by means of a Quality Management System that is aligned with ISO/IEC 17025. This can be achieved by:

- Maintaining a quality manual which sets out management policy, organization structure, job descriptions, procedures for testing, calibration of equipment, and maintaining an up-to-date record of standards, specifications and test methods. Furthermore, the laboratory shall conduct an independent review of all results;

AND

- Illustrating how the laboratory maintains satisfactory control of the quality of its testing. The Program Manager or his designate may, at his/her discretion, witness specific tests performed by designated staff for clients.

6.5 Equipment, Records, and On-site Checks

6.5.1 Equipment

The laboratory shall demonstrate that the equipment in use conforms to the requirement of the test methods, and is appropriately calibrated for use.

6.5.2 Records

Records of maintenance and calibration will be required where appropriate and available on-site for inspection.

6.5.3 On-Site Checks

The laboratory shall permit the Certification Program Manager and/or CCIL Inspectors to carry out random on-site checks of scales, ovens and other equipment to verify accuracy and calibration.

6.6 Facilities & Environment

Adequate space, lighting, heating, ventilation, power source and good housekeeping will be considered where the quality of testing may be affected by these factors. Particular attention in this regard, will be paid to mobile laboratories.

6.7 Calibration and Traceability

6.7.1 Calibration

All measuring and testing equipment having an effect on the accuracy of tests shall be checked and/or calibrated before being put into service. The laboratory shall make up-to-date certificates available for any equipment calibrated by outside agencies.

6.7.2 Traceability

Laboratory measurements shall, where applicable, be traceable to national standards. Where such standards are not applicable, the laboratory shall provide satisfactory evidence of correlation via the Inter-laboratory Correlation Test Program.

6.8 Sub-contracting

6.8.1 Where a laboratory sub-contracts any part of the testing specified in CCIL LC-101, the work shall be performed by a laboratory currently certified for those specific tests. The quality manual of the laboratory must demonstrate how the quality of the subcontracted laboratory testing will be maintained and verified.

6.8.2 The laboratory shall demonstrate that the sub-contractor is competent to perform the tests in question and uses appropriate test methods and procedures. In no case shall an integral part of a test procedure be sub-contracted.

6.9 Guidelines for Responsibilities and Duties of the Laboratory

The laboratory shall subscribe to the following general guidelines for responsibilities and duties.

6.9.1 Guidelines

It shall be the responsibility of the laboratory to ensure that it performs only inspections or tests for which it is fully equipped and staffed and that its employees perform only inspections and tests for which they are properly trained.

6.9.2 Responsibilities and Duties

The following duties are required of the testing laboratory:

- perform all testing operations in accordance with appropriate standards;
- call to the immediate attention of the proper authority, any irregularity or deficiency; and
- submit promptly to the proper authority formal reports of all tests that indicate compliance or non-compliance with the specifications. The reports shall be complete and factual, citing methods used in the tests performed, the specified values for the measured characteristics, the values obtained, the identification of the work involved and similar pertinent data.

6.10 Annual Report

6.10.1 The CCIL Certified Laboratory is required to file a report (questionnaire) with the Certification Program Manager, on an annual basis, to verify that qualified technical personnel are employed, the equipment is well maintained and where appropriate, calibrated and CCIL certification requirements have been met.

6.10.2 This report is to be signed by the professional engineer, or equivalent manager, responsible for the laboratory.

6.10.3 New laboratories must complete and send the Questionnaire to the Certification Program Manager before CCIL can issue certification.

6.11 Laboratory Re-location or Sale of Facilities

6.11.1 When a certified mobile laboratory is moved from one location to another, re-inspection and re-certification are not required.

6.11.2 When a complete laboratory is moved from its original location and assembled in a new permanent or mobile facility, the Certification Program Manager shall be immediately advised in writing and a re-inspection by the Certification Program Manager or a CCIL Inspector designated by the Certification Program Manager shall be undertaken. The timing of the re-inspection is left to the discretion of the Certification Program Manager. During the interim period, the Certification of the laboratory shall remain in force.

6.11.3 When a company is purchased by another corporate entity, any CCIL certified laboratories which changed ownership will be deemed to continue to be certified pending a re-inspection by the Certification Program Manager or a CCIL Inspector designated by the Certification Program Manager. Timing of the re-inspection is left to the discretion of the Program Manager.

6.11.4 When a CCIL certified laboratory is purchased by another corporate entity, the existing certification will be revoked immediately. For the purpose of certification, the laboratory will be considered as a new laboratory by CCIL and the new owner must initiate the certification process by filing an appropriate application.

6.11.5 Information on the application and certification processes can be found on the CCIL website (www.ccil.com).

7.0 Suspension and Withdrawal of Certification and Appeals and Disputes of Certification Decisions

7.1 The certification of any laboratory or laboratory technician found not to comply with the requirements of the certification program may be suspended or withdrawn until corrective action, acceptable to the Certification Program Manager, has been taken. The suspension or withdrawal can be based on an on-site inspection or as a result of an investigation of a complaint. Any suspension or withdrawal of certification will follow CCIL Certification Procedure for the Suspension, Withdrawal, Appeals and Disputes of Certification.

7.2 Suspension or withdrawal of certification may also be invoked by the Certification Program Manager for administrative reasons such as lack of timely payment of outstanding fees, or failure of a laboratory to comply with the CCIL Memorandum of Understanding. CCIL Certification Procedure for the Suspension, Withdrawal, Appeals and Disputes of Certification also applies in these situations.

7.3 The laboratory has the right to appeal certification decisions, such as those for the suspension or withdrawal, within five (5) business days of being advised of the

decision, in person or by appropriate telecommunications to the Certification Program Manager. The appeal process shall be in accordance with Section 5 of the CCIL Certification Procedure for the Suspension, Withdrawal, Appeals and Disputes of Certification. The laboratory will be notified in writing on the decision of the subcommittee within five (5) business days of the appeal hearing.

7.4 If after reviewing the appeal and supporting information, this subcommittee decides that certification should be restored, the certification status will be re-instated and, if necessary, a certificate will be issued and the company's name will appear on the CCIL certified laboratory list. If not, the laboratory will be advised that a second level final appeal (dispute mechanism) is available.

7.5 If the appeal does not result in re-instatement of the laboratory's certification, the laboratory may initiate a dispute to be presented in writing to the Executive Committee within five (5) business days of the date of notification of denial. The dispute process shall be in accordance with Section 6 of the CCIL Certification Procedure for the Suspension, Withdrawal, Appeals and Disputes of Certification. The Executive Committee will set a time and date within thirty (30) days of the date the dispute was received to study the appeal of the laboratory as well as the decision of the CPAC.

7.6 All costs related to the appeal and dispute mechanisms will be borne by the laboratory.

7.7 Withdrawal of certification will not preclude a laboratory from applying for certification at a future date.

7.8 CCIL and the Certification Office staff, contractors and committees shall not be liable for damages, of any nature or kind, howsoever caused, because of suspension or withdrawal of certification of a laboratory or technician.

8.0 Laboratory Technician Certification Programs

8.1 Background

8.1.1 As a complement to the laboratory certification program, CCIL provides Laboratory Technician Certification Programs with the objective of further improving reliability and reproducibility of test results through the standardization of fundamental knowledge and skills of personnel involved in the testing of hot mix asphalt and aggregates.

8.1.2 The Technician Certification programs are open to all CCIL Certified Laboratory employees involved in providing testing services for road construction. The program is self-supporting with fees to be established on the basis of the number of participants and course material cost.

8.1.3 Participants successfully meeting the program requirements will be issued an Identification Card by CCIL. The card will show the name of the laboratory/company of employment as well as the name of the technician. This card is the property of

CCIL (i.e. to be retrieved by the company when the employee leaves that company on a permanent basis). A new card will be issued by CCIL to the technician via the new company of employment. In the event of such changes the five-year duration of the certification starting from the initial date of certification will remain in effect. Responsibility for reporting such changes to CCIL resides with both the laboratories/companies and the technician involved in this process.

8.2 Responsibilities and Duties

It shall be the responsibility of the Laboratory Technician to ensure:

- that he/she performs only tests for which he/she is certified/qualified to perform.
- perform all testing in accordance with appropriate standards

8.3 Specific Technician Certification Requirements

The specific technician certification requirements are provided in Appendix A-10.

All Technicians shall keep up with any changes to the methods and procedures pertinent to the work for which the laboratory is certified.

9.0 Complaints

An individual or corporate identity may file a complaint relating to CCIL practices or the activities of a certified laboratory or a certified technician in accordance with the procedures described in the document “CCIL Procedure for Handling Complaints”.

10.0 Use of the CCIL Logo

The CCIL Certification Office has established policies and procedures for the correct use of the CCIL Certification logo. Certified laboratories requesting the use of the CCIL logo must enter a Memorandum of Understanding with the CCIL Certification Office prior to its use.

APPENDIX A-1 CERTIFICATION PROGRAM REQUIREMENTS LIST OF APPENDICES

- Appendix A-2** - Asphalt Mix Compliance Laboratories - Marshall Method (Type B)
- Appendix A-3** - Asphalt Mix Compliance Laboratories - Superpave Method (Type B)
- Appendix A-4** - Asphalt Mix Design Laboratories - Marshall Methods (Type A)
- Appendix A-5** - Asphalt Mix Design Laboratories - Superpave Methods (Type A)
- Appendix A-6** - Penetration Testing of Recovered Asphalt Cement (Type E)
- Appendix A-7** - Performance Graded Asphalt Cement Laboratories (Type F)
- Appendix A-8** - Aggregate Quality Control Laboratories (Type C)
- Appendix A-9** - Aggregate Physical Property Laboratories (Type D)
- Appendix A-10** – Asphalt and Aggregate Technician Certification

Appendix A-2

Requirements for Asphalt Mix Compliance Laboratory Marshall Method (Type B)

1.0 General

These requirements apply to Asphalt Mix Compliance Laboratories involved in the testing of asphalt mixes using the Marshall Method to check for compliance with specifications such as: gradation, Asphalt Content (AC), compaction, bulk relative density of compacted samples, theoretical maximum relative density, stability, flow, air voids and voids in mineral aggregate (often termed Marshall Compliance check). The laboratory may be either permanent or mobile. The laboratory must have the necessary general equipment for sampling, transportation, storage and re-heating of samples, if necessary, without adverse effect. The laboratory must have the capability to support the specific testing involved.

2.0 Staff

2.1 The general testing services of an Asphalt Mix Compliance Laboratory will be under the direction and control of a person charged with engineering-management responsibility. This designated person shall be a Professional Engineer (or equivalent as approved by the Certification Program Manager) and a full-time employee of the company/organization, and have at least three years' experience in the inspection and testing of construction materials.

2.2 The direct testing services of an Asphalt Mix Compliance Laboratory will be supervised by a supervisory laboratory technician with at least three years' experience performing tests on construction materials. This designated person shall be able to demonstrate the ability to perform all tests required in the manner stipulated under governing procedures. This person shall keep up with developments in asphalt technology and have C.E.T. designation (or equivalent approved by the Certification Program Manager).

2.3 Technicians employed in an Asphalt Mix Compliance Laboratory shall have the necessary experience to complete the required tests under the direct supervision of the supervisory laboratory technician. There shall be at least one CCIL certified laboratory technician, who has met the requirements of the CCIL Asphalt Technician Certification Program, working in the laboratory while the laboratory is in operation.

2.4 The supervisory laboratory technician or the engineering manager will be responsible for reporting the test results to clients.

3.0 Equipment, Manuals and Reporting Procedures

3.1 A Marshall Asphalt Mix Compliance Laboratory must have the necessary equipment, manuals and reporting procedures to perform compliance checks on bituminous mixes in accordance with the test methods specified in Table 1 for the specific provincial jurisdiction/owner.

Table 1 – Asphalt Mix Tests

Test	Test Method (Note 3)
Preparation of Marshall Specimens	D6926/LS-261
Determination of Bulk Relative Density of Compacted Bituminous Mixes Using Saturated Surface-Dry Specimens	D2726/LS-262
Bulk Relative Density of Compacted Bituminous Mixes Using either Coated Specimens or Using Automatic Vacuum Sealing Equipment	D1188/LS-306 or D6752
Marshall Stability and Flow of Bituminous Mixtures (See Note 1)	D6927/LS-263
Theoretical Maximum Relative Density of Bituminous Paving Mixtures, (see Note 1)	D2041/LS-264
Percent Air Voids in Compacted Dense Bituminous Pavement Mixtures	D3203/LS-265
Voids in Mineral Aggregate (V.M.A.) in Compacted Bituminous Mixtures (See Note 2)	AI MS-2/LS-266
Percent Compaction of Compacted Bituminous Paving Mixtures	ATT-67/LS- 281/LS-287
Quantitative Extraction of Asphalt Cement from Bituminous Paving Mixtures - Using either Solvent Methods and/or - Ignition Furnace	D2172/LS-282 and/or D6307/LS- 292/ATT-74
Sieve Analysis of Extracted Aggregates	D5444/LS- 282/LS-292

Note 1: Some provincial jurisdictions may not require this capability.

Note 2: The laboratory may be supplied with aggregate densities to determine the V.M.A.

Note 3: Test Methods are publications of the following organizations:

- “C” or “D” are ASTM,
- “LS” are MTO,
- “AI” are Asphalt Institute,
- “ATT” are Alberta Transportation, and

- “T” are AASHTO

3.2 The laboratory must keep up with any changes to these methods and procedures and update the laboratory manuals and procedures when necessary.

3.3 In addition to these tests, an Asphalt Mix Compliance Laboratory should be able to complete, or have documented access to a CCIL certified laboratory able to complete the testing in Table 2.

Table 2 – Additional Tests

Test	Test Method (Note 3)
Penetration of Bituminous Materials	D5/LS-200
Kinematic Viscosity of Asphalt	D2170/LS-202
Resistance to Stripping of Asphalt Cement in Bituminous Mixtures	T283/LS-283
Effect of Heat and Air on a Moving Film of Asphalt (Rolling Thin-Film Oven Test)	T240
Accelerated Aging of Asphalt Binder Using a Pressurized Aging Vessel (PAV)	R28
Determining the Flexural Creep Stiffness of Asphalt Binder Using the Bending Beam Rheometer (BBR)	T313
Determining the Rheological Properties of Asphalt Binder Using a Dynamic Shear Rheometer (DSR)	T315
Viscosity Determination of Asphalt Binder Using Rotational Viscometer (RV)	T316

APPENDIX A-3

REQUIREMENTS FOR ASPHALT MIX COMPLIANCE LABORATORY – SUPERPAVE METHOD (TYPE B)

1.0 General

These requirements apply to Asphalt Mix Compliance laboratories (Type B) involved in the testing of asphalt mixes using the Superpave method to check for compliance with specifications such as: gradation, AC content, compaction, bulk relative density of compacted samples, theoretical maximum relative density, air voids and voids in mineral aggregate. The laboratory may be either permanent or mobile. The laboratory must have the necessary general equipment for sampling, transportation, storage and re-heating of samples, if necessary, without adverse effect. The laboratory must have the capability to support the specific testing involved. Type B Superpave Asphalt Mix Compliance laboratories must also be CCIL certified for testing Marshall asphalt mix compliance, as specified in Appendix A-2.

2.0 Staff

2.1 The general testing services of an Asphalt Mix Compliance Laboratory will be under the direction and control of a person charged with engineering-management responsibility. This designated person shall be a Professional Engineer (or equivalent as approved by the Certification Program Manager) and a full-time employee of the company/organization, and have at least three years' experience in the inspection and testing of construction materials.

2.2 The direct testing services of an Asphalt Mix Compliance Laboratory will be supervised by a supervisory laboratory technician with at least three years' experience performing tests on construction materials. This designated person shall be able to demonstrate the ability to perform all tests required in the manner stipulated under governing procedures. This person shall keep up with developments in asphalt technology and have C.E.T. designation or equivalent (as approved by the Certification Program Manager).

2.3 Technicians employed in an Asphalt Mix Compliance Laboratory shall have the necessary experience to complete the required tests under the direct supervision of the supervisory laboratory technician. There shall be at least one CCIL certified laboratory technician, who has met the requirements of the CCIL Superpave Asphalt Technician Certification Program, working in the laboratory while that laboratory is in operation.

2.4 The supervisory laboratory technician or the engineering manager will be responsible for reporting the test results to clients.

3.0 Equipment, Manuals and Reporting Procedures

3.1 An Asphalt Mix Compliance Laboratory using the Superpave method must have the necessary equipment, manuals and reporting procedures to perform compliance

checks on bituminous mixes in accordance with the test methods specified in Table 1 for the specific provincial jurisdiction/owner.

Table 1 – Asphalt Mix Tests

Tests	Test Method (Note 2)
Preparing and Determining the Density of Hot Mix Asphalt Specimens by Means of the Superpave Gyrotory Compactor	T312/LS-313
Bulk Specific Gravity of Compacted Asphalt Mixes Using Saturated Surface-Dry Specimen	D2726/T166
Bulk Relative Density of Compacted Bituminous Mixes Using either Coated Specimens or Using Automatic Vacuum Sealing Equipment	D1188/LS-306 or D6752
Theoretical Maximum Relative Density of Bituminous Paving Mixtures	D2041/LS-264
Percent Air Voids in Compacted Dense Bituminous Pavement Mixtures	D3203/LS-265
Voids in Mineral Aggregate (V.M.A.) in Compacted Bituminous Mixtures (See Note 1)	AI SP-2/LS-266
Percent Compaction of Compacted Bituminous Paving Mixtures	ATT-67/LS- 281/LS-287
Quantitative Extraction of Asphalt Cement from Bituminous Paving Mixtures - Using either Solvent Methods and/or - Ignition Furnace	D2172/LS-282 and/or D6307/LS- 292/ATT-74
Sieve Analysis of Extracted Aggregates	D5444/LS 282/LS 292

Note 1: The laboratory may be supplied with aggregate densities to determine the V.M.A.

Note 2: Test Methods are publications of the following organizations:

- “C” or “D” are ASTM,
- “LS” are MTO,
- “AI” are Asphalt Institute,
- “ATT” are Alberta Transportation, and
- “T” are AASHTO

3.2 The laboratory must keep up with any changes to these methods and procedures and update the laboratory manuals and procedures when necessary.

3.3 In addition to these tests, an Asphalt Mix Compliance Laboratory using Superpave methods shall be able to complete or have documented access to a CCIL certified laboratory able to complete the testing in Table 2.

Table 2 – Additional Tests

Test	Test Method (Note 2)
Penetration of Bituminous Materials	D5/LS-200
Kinematic Viscosity of Asphalt	D2170/LS-202
Resistance to Stripping of Asphalt Cement in Bituminous Mixtures	T283/LS-283
Effect of Heat and Air on a Moving Film of Asphalt (Rolling Thin-Film Oven Test)	T240
Accelerated Aging of Asphalt Binder Using a Pressurized Aging Vessel (PAV)	R28
Determining the Flexural Creep Stiffness of Asphalt Binder Using the Bending Beam Rheometer (BBR)	T313
Determining the Rheological Properties of Asphalt Binder Using a Dynamic Shear Rheometer (DSR)	T315
Viscosity Determination of Asphalt Binder Using Rotational Viscometer (RV)	T316

Appendix A-4

REQUIREMENTS FOR ASPHALT MIX DESIGN LABORATORY MARSHALL METHOD (TYPE A)

1.0 General

1.1 These requirements apply to Asphalt Mix Design Laboratories (Type A) involved in designing and testing Hot Mix Asphalt (HMA) using the Marshall Method. The laboratory must have the capability to support the specific testing involved. In addition, Asphalt Mix Design laboratories using the Marshall Method must also be CCIL certified for Type B asphalt mix compliance requirements, as specified in Appendix A-2.

2.0 Staff

2.1 An Asphalt Mix Design Laboratory using the Marshall Method will be under the direction and control of a person charged with engineering-management responsibility. This designated person shall be a Professional Engineer (or equivalent as approved by the Certification Program Manager) and a full-time employee of the asphalt laboratory and have at least five years' experience in the inspection and testing of construction materials. All Marshall mix designs submitted to clients shall be approved by this person.

2.2 The direct Marshall design services of an Asphalt Mix Design Laboratory (i.e. Marshall design activities) will be supervised by a supervisory laboratory technician with at least five years' experience performing tests on construction materials. This person shall keep up with developments in asphalt technology and have C.E.T. designation (or equivalent as approved by the Certification Program Manager).

2.3 Technicians employed in a Mix Design Asphalt Laboratory shall have the necessary experience to complete the required tests for Mix Design laboratories under the direct supervision of the supervisory laboratory technician. There shall be at least one CCIL certified laboratory technician, who has met the requirements of the CCIL Asphalt Technician Certification Program, working in the laboratory while that laboratory is in operation.

2.4 The supervisory laboratory technician or the engineering manager will be responsible for reporting the test results to clients.

3.0 Equipment, Manuals and Reporting Procedures

3.1 An Asphalt Mix Design Laboratory involved in designing and testing Hot Mix Asphalt (HMA) using the Marshall Method must have the necessary equipment, manuals and reporting procedures to perform compliance checks on bituminous mixes in accordance with the test methods specified in Table 1 for the specific provincial jurisdiction/owner.

Table 1 – HMA Tests (Marshall Method)

Test	Test Method (Note 1)
Preparation of Marshall Specimens	D6926/LS-261
Determination of Bulk Relative Density of Compacted Bituminous Mixes Using Saturated Surface-Dry Specimens	D2726/LS-262
Bulk Relative Density of Compacted Bituminous Mixes Using either Coated Specimens or Using Automatic Vacuum Sealing Equipment	D1188/LS-306 or D6752
Marshall Stability and Flow of Bituminous Mixtures	D6927/LS-263
Theoretical Maximum Relative Density of Bituminous Paving Mixtures	D2041/LS-264
Percent Air Voids in Compacted Dense Bituminous Pavement Mixtures	D3203/LS-265
Voids in Mineral Aggregate (V.M.A.) in Compacted Bituminous Mixtures	AI MS-2/LS-266
Percent Compaction of Compacted Bituminous Paving Mixtures	ATT-67/LS-281/LS-287
Quantitative Extraction of Asphalt Cement from Bituminous Paving Mixtures - Using either Solvent Methods and/or - Ignition Furnace	D2172/LS-282 and/or D6307/LS-292/ATT-74
Sieve Analysis of Extracted Aggregates	D5444/LS 282/LS 292
Dry Preparation of Aggregates for Determination of Physical Constants	C702/LS-600
Sieve Analysis of Fine and Coarse Aggregates	C136/LS-602
Material Finer than 75 µm Sieve in Mineral Aggregates by Washing	C117/LS-601
Relative Density and Absorption of Coarse Aggregate	C127/LS-604
Relative Density and Absorption of Fine Aggregate	C128/LS-605
Determination of Percent Crushed Particles in Coarse Aggregate	D5821/LS-607
Percent Flat and Elongated Particles in Coarse Aggregate	D4791/LS-608

Note 1: Test Methods are publications of the following organizations:

- “C” or “D” are ASTM,

- “LS” are MTO,
- AI are Asphalt Institute,
- ATT are Alberta Transportation, and
- “T” are AASHTO

3.2 The laboratory must keep up with any changes to these methods and procedures and update the laboratory manuals and procedures when necessary.

3.3 Asphalt Mix Design Laboratory designing and testing Hot Mix Asphalt (HMA) using the Marshall Method must be able to complete, or have documented access to a CCIL certified laboratory able to complete, any additional tests required by the provincial jurisdiction/owner that are part of their Marshall Mix Design protocol. Examples of such tests are listed in Table 2.

Table 2 – Additional Tests

Test	Test Method (Note 1)
Penetration of Bituminous Materials	D5/LS-200
Kinematic Viscosity of Asphalt	D2170/LS-202
Resistance to Stripping of Asphalt Cement in Bituminous Mixtures	T283/LS-283
Stripping by Static Immersion	LS-285
Soundness of Aggregate by Use of Magnesium Sulphate	C88/ LS-606
Petrographic Analysis of Coarse Aggregate	LS-609
Resistance of Coarse Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus	D6928/LS-618
Resistance of Fine Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus	D7428/LS-619
Effect of Heat and Air on a Moving Film of Asphalt (Rolling Thin-Film Oven Test)	T240
Accelerated Aging of Asphalt Binder Using a Pressurized Aging Vessel (PAV)	R28
Determining the Flexural Creep Stiffness of Asphalt Binder Using the Bending Beam Rheometer (BBR)	T313
Determining the Rheological Properties of Asphalt Binder Using a Dynamic Shear Rheometer (DSR)	T315
Viscosity Determination of Asphalt Binder Using Rotational Viscometer (RV)	T316

3.4 An Asphalt Mix Design Laboratory designing and testing Hot Mix Asphalt (HMA) using the Marshall Method must only complete Marshall designs to variations in the Marshall method as requested (Transport Canada, etc.) if the laboratory has the necessary additional and/or modified equipment, manuals and reporting procedures.

APPENDIX A-5

REQUIREMENTS FOR ASPHALT MIX DESIGN LABORATORY SUPERPAVE METHOD (TYPE A)

1.0 General

These requirements apply to Asphalt Mix design laboratories involved in designing and testing Hot Mix Asphalt (HMA) using the Superpave Method. The laboratory must have the capability to support the specific testing involved. In addition, Type A asphalt mix design laboratories using the Superpave method must also be CCIL certified for Type B Superpave asphalt mix compliance requirements, as specified in Appendix A-3.

2.0 Staff

2.1 An Asphalt Mix Design Laboratory using the Superpave Method shall be under the direction and control of a person charged with engineering-management responsibility. This designated person shall be a Professional Engineer (or equivalent as approved by the Certification Program Manager) and a full-time employee of the asphalt laboratory, and have at least five years experience in the inspection and testing of construction materials. All Superpave mix designs submitted to clients shall be approved by this person.

2.2 The direct design services of an Asphalt Mix Design Laboratory using the Superpave method shall be supervised by a laboratory technician with at least five years' experience performing tests on construction materials. This person shall keep up with developments in asphalt technology and have C.E.T. designation (or equivalent as approved by the Certification Program Manager).

2.3 Technicians employed in an Asphalt Mix Design Laboratory using the Superpave method shall have the necessary experience to complete the required tests under the direct supervision of the supervisory laboratory technician. There shall be at least one CCIL certified laboratory technician who, has met the requirements of the CCIL Superpave Asphalt Technician Certification Program, working in the laboratory while the laboratory is in operation.

2.4 The supervisory laboratory technician or the engineering manager will be responsible for reporting the test results to clients.

3.0 Equipment, Manuals and Reporting Procedures

3.1 An Asphalt Mix Design Laboratory using the Superpave method must have the necessary equipment, manuals and reporting procedures in accordance with the requirements of the specific provincial jurisdiction/owner.

3.2 The laboratory shall have the capability to conduct the tests and/or determinations as defined in Table 1.

Table 1 – Asphalt Mix Design Tests

Test	Test Method (Note 2)
Superpave Volumetric Mix Design	M323
Mixture Conditioning of Hot Mix	R30
Preparing and Determining the Density of Hot-Mix Asphalt (HMA) Specimens by Means of the Superpave Gyratory Compactor	T312/LS-313
Bulk Relative Density of Compacted Bituminous Mixes Using either Coated Specimens or Using Automatic Vacuum Sealing Equipment	D1188/LS-306 or D6752
Resistance of Compacted Asphalt Mixtures to Moisture-Induced Damage	T283
Theoretical Maximum Relative Density of Bituminous Paving Mixtures	D2041/LS-264
Percent Air Voids in Compacted Dense Bituminous Pavement Mixtures	D3203/LS-265
V.M.A. in Compacted Bituminous Mixtures	AI SP-2/LS-266
Draindown Characteristics in Uncompacted Asphalt Mixtures (if required, see Note 1)	T305/LS-310
Percent Compaction of Compacted Bituminous Paving Mixtures	ATT-67/LS- 281/LS-287
Quantitative Extraction of Asphalt Cement from Bituminous Paving Mixtures - Using either Solvent Methods and/or - Ignition Furnace	D2172/LS-282 and/or D6307/LS- 292/ATT-74
Sieve Analysis of Extracted Aggregates	D5444/LS 282/LS 292
Sieve Analysis of Fine and Coarse Aggregates	C136/LS-602
Dry Preparation of Aggregates for Determination of Physical Constants	C702/LS-600
Material Finer than 75 µm Sieve in Mineral Aggregates by Washing	C117/LS-601
Relative Density and Absorption of Coarse Aggregate	C127/LS-604
Relative Density and Absorption of Fine Aggregate	C128/LS-605
Determination of Percent Crushed Particles in Coarse Aggregate	D5821/LS-607

Percent Flat and Elongated Particles in Coarse Aggregate	D4791/LS-608
Uncompacted Void Content of Fine Aggregate	T304/LS-629
Sand Equivalent/Clay Content of Fine Aggregate	D2419/ T176

Note 1: This capability is only required for testing/design of SMA and open-graded mixtures.

Note 2: Test Methods are publication of the following organizations:

- “C” or “D” are ASTM,
- “LS” are MTO,
- “AI” are Asphalt Institute,
- “ATT” are Alberta Transportation, and
- “T”, “R” and “M” are AASHTO

3.3 An Asphalt Mix Design Laboratory using the Superpave method must be able to complete, or have documented access to a CCIL certified laboratory able to complete any additional tests, required by the provincial jurisdiction/owner that are part of their Superpave Mix Design protocol. Examples of such tests are listed in Table 2.

Table 2 – Additional Tests

Test	Test Method (Note 2)
Soundness of Aggregate by Use of Magnesium Sulphate	C88/LS-606
Petrographic Analysis of Coarse Aggregate	LS-609
Resistance of Coarse Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus	D6928//LS-618
Resistance of Fine Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus	D7428/LS-619
Effect of Heat and Air on a Moving Film of Asphalt (Rolling Thin-Film Oven Test)	T240
Accelerated Aging of Asphalt Binder Using a Pressurized Aging Vessel (PAV)	R28
Determining the Flexural Creep Stiffness of Asphalt Binder Using the Bending Beam Rheometer (BBR)	T313
Determining the Rheological Properties of Asphalt Binder Using a Dynamic Shear Rheometer (DSR)	T315
Viscosity Determination of Asphalt Binder Using Rotational Viscometer (RV)	T316

3.5 An Asphalt Mix Design Laboratory using the Superpave method must keep up with any changes to these methods and procedures, update the laboratory manuals and procedures when necessary and only complete designs to variations in the Superpave methods as requested (Transport Canada, etc.) if the laboratory has the necessary additional and/or modified equipment, manuals and reporting procedures.

APPENDIX A-6:

REQUIREMENTS FOR LABORATORIES CARRYING OUT PENETRATION TESTING OF RECOVERED ASPHALT CEMENT (TYPE E)

1.0 General

These requirements apply to Type E laboratories that conduct tests to check for compliance with specifications for penetration of recovered asphalt cement. The laboratory may be either permanent or mobile. The laboratory must have the necessary general equipment for sampling, transportation, storage and re-heating, if necessary, without adverse effect. A Type E laboratory must also be CCIL certified as an Asphalt Mix Compliance and/or Design (Type A or Type B) laboratory, as specified in Appendices A-2, A-3, A-4 and/or A-5.

2.0 Staff

2.1 The testing services will be under the direction and control of a person charged with engineering-management responsibility. This designated person shall be a Professional Engineer (or equivalent as approved by the Certification Program Manager) and a full-time employee of the Asphalt Laboratory and have at least three years' experience in the testing of construction materials.

2.2 The direct testing services of the Laboratory will be supervised by a supervisory laboratory technician with at least three years' experience performing tests on construction materials. This designated person shall be able to demonstrate the ability to perform all tests required in the manner stipulated under governing procedures of the specific provincial jurisdiction/owner. This person shall keep up with developments in asphalt technology and have C.E.T. designation (or equivalent as approved by the Certification Program Manager).

2.3 Technicians employed in the Laboratory shall have the necessary experience to complete the required tests under the direct supervision of the supervisory laboratory technician. There shall be at least one CCIL certified laboratory technician, who has met the requirements of the CCIL Asphalt Technician Certification Program, working in the laboratory at all times that the laboratory is in operation.

2.4 The supervisory laboratory technician or the engineering manager will be responsible for reporting the test results to clients.

3.0 Equipment, Manuals and Reporting Procedures

A Type E Laboratory must have the necessary equipment, manuals and reporting procedures to perform test specified in Table 1, for the specific provincial jurisdiction/owner.

Table 1 – Penetration Tests on Recovered Asphalt Cement

Test	Test Method (Note 1)
Penetration of Bituminous Materials	D5/LS-200
Recovery of Asphalt from Solution by Abson Method or Using the Rotary Evaporator	D1856/LS-284 or D5404/LS-284

Note 1: Test Methods are publications of the following organizations:

- “D” are ASTM,
- “LS” are MTO.

Appendix A-7

REQUIREMENTS FOR LABORATORIES TESTING PERFORMANCE GRADED ASPHALT CEMENT (TYPE F)

1.0 General

These requirements apply to Type F Performance Graded Asphalt laboratories that conduct tests to check for compliance with specifications for Performance Graded Asphalt Cement (PGAC) (also known as PG binders). The laboratory must have the necessary general equipment for sampling, transportation, storage and sample preparation without adverse effect. Unless the laboratory is dedicated to binder testing only, it must also be CCIL certified as a Type A and/or Type B laboratory. The laboratory must have the capability to support the specific testing involved.

2.0 Staff

2.1 The testing services will be under the direction and control of a person charged with engineering-management responsibility. This designated person shall be a Professional Engineer (or equivalent as approved by the Certification Program Manager) and a full-time employee of the PGAC Laboratory and have at least three years' experience in the testing of construction materials.

2.2 The direct testing services of the Laboratory will be supervised by a supervisory laboratory technician with at least three years' experience performing tests on construction materials. This designated person shall be able to demonstrate the ability to perform all tests required in the manner stipulated under the governing procedures. This person will keep up with developments in asphalt technology and have C.E.T. designation (or equivalent as approved by the Certification Program Manager).

2.3 The supervisory laboratory technician or the engineering manager will be responsible for reporting the test results to clients.

2.4 Technicians employed in the Laboratory shall have the necessary experience to complete the required tests under the direct supervision of the supervisory laboratory technician.

3.0 Equipment, Manuals and Reporting Procedures

3.1 A Type F Performance Graded Asphalt laboratory must have the necessary equipment, manuals and reporting procedures to perform compliance checks on PGAC in accordance with the test methods specified in the Table 1 for the specific provincial jurisdiction/owner.

Table 1 – PGAC Tests

Test	Test Method (Note 1)
Grading or Verifying the Performance Grade of an Asphalt Binder	R29
Effect of Heat and Air on a Moving Film of Asphalt (Rolling Thin-Film Oven Test)	T240
Accelerated Aging of Asphalt Binder Using a Pressurized Aging Vessel (PAV)	R28
Determining the Flexural Creep Stiffness of Asphalt Binder Using the Bending Beam Rheometer (BBR)	T313
Determining the Rheological Properties of Asphalt Binder Using a Dynamic Shear Rheometer (DSR)	T315
Viscosity Determination of Asphalt Binder Using Rotational Viscometer (RV)	T316

Note 1: Test Methods are publications of the following organizations:

- “D” are ASTM,
- “LS” are MTO
- “R” and “T” are AASHTO

3.2 The laboratory must keep up with any changes to these methods and procedures and update the laboratory manuals and procedures when necessary.

3.3 The laboratory must be able to complete, or have documented access to a CCIL certified laboratory able to complete, any additional tests required by the provincial jurisdiction/owner that are part of their binder testing protocol. Examples of such tests are listed in Table 2.

Table 2 – Additional PGAC Tests

Test	Test Method (Note 1)
Determining the Fracture Properties of Asphalt Binder in Direct Tension (DT)	T314
Multi Stress Creep and Recovery (MSCR) of Asphalt Binder Using a Dynamic Shear Rheometer	D7405
Determination of Asphalt Cement's Resistance to Ductile Failure Using Double Edge Notched Tension Test (DENT)	LS-299
Determination of Performance Grade of Physically Aged Asphalt Cement Using Extended Bending Beam Rheometer (BBR)	LS-308

APPENDIX A-8

REQUIREMENTS FOR AGGREGATE QUALITY CONTROL LABORATORIES (TYPE C)

1.0 General

These requirements apply to Type C aggregate quality control laboratories involved in the standard quality control testing of aggregates to verify compliance with provincial jurisdiction/customer specifications using the standard test methods listed in Table 1 below. The laboratory must have the necessary general equipment for sampling, transportation, testing and storage of samples. The laboratory must have the capability to support all the testing specified by the specific provincial jurisdiction/owner.

2.0 Staff

2.1 The general testing services of an Aggregate Quality Control Laboratory will be under the direction and control of a person charged with engineering-management responsibility. This designated person shall be qualified by education and experience and be a full-time management employee of the Owner of the aggregate laboratory.

2.2 The direct testing services of an Aggregate Quality Control Laboratory will be supervised by a supervisory laboratory technician with at least three years' experience performing tests on construction materials. This designated person shall be able to demonstrate the ability to perform all tests required in the manner stipulated under various procedures. This person shall keep up with developments in aggregate technology and have C.E.T. designation or equivalent experience and training as approved by the Certification Program Manager. This person shall also be certified by CCIL as being proficient at aggregate testing.

2.3 Individuals lacking the three years experience required for a supervisory technician may apply to the Certification Program Manager for consideration of past education and work experience. A written examination demonstrating proficiency in all areas of aggregate testing may be administered by the Certification Program Manager in lieu of the completion of the three years' work experience.

2.4 A supervisory technician may supervise more than one laboratory operation, and does not need to be physically on-site at all times. However, the supervisory technician must carry out frequent visits to the laboratory and shall review all test results before they are issued.

2.5 Technicians employed in the laboratory shall have the necessary training and experience to complete the required tests under the direct supervision of the supervisory laboratory technician. All technicians performing Type C testing in a laboratory shall be certified as proficient in performing the designated tests.

2.6 Once the laboratory technicians have passed the practical and written exams, the CCIL inspector provides the technician with a signed and dated copy of the front page of the tests to indicate the successful completion of the qualification

requirements. Subsequently, technician cards, signifying technician certification, shall be issued by the CCIL Certification office and shall include an expiry date which will be five years from the date of issue appearing on the temporary card. This card is the property of CCIL (i.e. to be retrieved by the company when the employee leaves that company on a permanent basis). A new card will be issued by CCIL to the technician via the new certified company of employment. In the event of such changes, the five year duration of the certification starting from the initial date of certification will remain in effect. Responsibility for reporting such changes to CCIL resides with both the laboratories/companies and the technician involved in this process.

2.7 The supervisory laboratory technician or the engineering manager will be responsible for reporting the test results to clients.

3.0 Equipment, Manuals and Reporting Procedures

3.1 The Aggregate Quality Control Laboratory must have the necessary equipment, manuals and reporting procedures to perform aggregate testing, in accordance with the standard test methods as specified in Table 1 and as required by the specific provincial jurisdiction/owner.

TABLE 1: Type C Aggregate Quality Control Test Methods

AB, SK, YT		BC, MB, NB, NL, NS		ON, QC	
ASTM Standards			MTO Laboratory Testing Manual		
Reducing Samples of Aggregate to Testing Size	C702	C702	Dry Preparation of Aggregates for Determination of Physical Constants	LS-600	
Material Finer than 75µm (No. 200) in Mineral Aggregates by Washing	C117	C117	Material Finer than 75µm in Mineral Aggregates by Washing	LS-601	
Sieve Analysis of Fine and Coarse Aggregates	C136	C136	Sieve Analysis of Aggregates	LS-602	
Determining the Percentage of Fractured Particles in Coarse Aggregate	D5821	D5821	Determination of Percent Crushed Particles in Processed Coarse Aggregate	LS-607	
Flat Particles, Elongated Particles or Flat and Elongated Particles in Coarse Aggregate	Not Applicable	D4791	Determination of Percent of Flat and Elongated Particles in Coarse Aggregate	LS-608	

3.2 The laboratory must keep up with any changes to these methods and procedures and update the laboratory manuals and procedures accordingly.

APPENDIX A-9

REQUIREMENTS FOR AGGREGATE PHYSICAL PROPERTY LABORATORIES (TYPE D)

1.0 General

1.1 These requirements apply to Type D aggregate laboratories that carry out some or all the aggregate physical property test procedures listed below in Tables 1, 2 and 3. The laboratory must have the necessary general equipment for sampling, transportation, testing and storage of samples for each of the tests for which it wishes to be certified. The laboratory must have the capability to support the specific testing involved at the location for which it is requesting certification. The certification is specific for only those tests that meet the certification requirements including the proficiency testing requirements, where applicable. Aggregate physical property laboratories (Type D) must also be certified as Type C laboratories and meet the requirements specified in Appendix 8 for Aggregate Quality Control Testing.

1.2 For an aggregate lab to be certified for Petrographic Analysis of Coarse Aggregate, LS-609, the lab must be Type C certified and meet Type D certification requirements for LS-609, including proficiency testing and inspection, and the lab must have direct access to the services of CCIL certified Petrographic (PN) Analyst. The Petrographic Analyst may be an employee of the lab or a consultant under contract with the laboratory.

2.0 Staff

2.1 The general testing services of an Aggregate Physical Property Laboratory will be under the direction and control of a person charged with engineering management responsibility. This designated person shall be a Professional Engineer, or equivalent, as determined by the Certification Program Manager, and a full-time employee of the aggregate laboratory, and have at least five years experience in the inspection and testing of construction materials.

2.2 The direct testing services of the laboratory will be supervised by a supervisory laboratory technician with at least five years' experience performing tests on construction materials. This designated person shall be able to demonstrate the ability to perform all tests required in a Type D Aggregate Laboratory, in the manner stipulated under various procedures. This person shall keep up with developments in aggregate technology and have CET designation or equivalent training and experience as determined by the Certification Program Manager.

2.3 Technicians employed in an Aggregate Physical Property Laboratory shall have the necessary experience and training to complete the required tests under the direct supervision of the supervisory laboratory technician. At least one employed technician shall be CCIL certified as a Type C aggregate technician. All aggregate testing performed under the CCIL certification program must be performed by CCIL certified aggregate technicians.

2.4 The supervisory laboratory technician or the engineering manager will be responsible for reporting the test results to clients.

3.0 Equipment, Manuals and Reporting Procedures

3.1 In addition to the requirements for Aggregate Quality Control certification, the laboratory must have the necessary equipment, manuals and reporting procedures to perform aggregate testing, in accordance with the standard test methods specified in Tables 1, 2 and 3.

Table 1 – Aggregate Physical Property Tests

Test	Test Method (Note 1)
Scaling Resistance of Concrete Surfaces Exposed to Deicing Chemicals	C672/LS-412
Resistance to Degradation of Coarse Aggregate by Abrasion and Impaction in the Los Angeles Abrasion Machine	C131 & 535/LS-603*
Relative Density and Absorption of Coarse Aggregate	C127/LS-604*
Relative Density and Absorption of Fine Aggregate	C128/LS-605*
Soundness of Aggregate by Use of Magnesium Sulphate	C88/LS-606*
Petrographic Analysis of Coarse Aggregate	LS-609**
Organic Impurities in Sands for Concrete	C40/LS-610
Determination of Insoluble Residue of Carbonate Aggregates	D3042/ LS-613
Freezing and Thawing of Coarse Aggregate	A23.2-24A/LS-614*
Determination of Potential Alkali-carbonate Reactivity of Carbonate Rocks by Chemical Composition	A23.2-26A/LS-615
Determination of Percent Particles with Two or More Crushed Faces and Uncrushed Particles in Processed Coarse Aggregate (Only for Ontario labs)	LS-617
Micro-Deval Abrasion Testing of Coarse Aggregate	D6928/LS-618*
Resistance of Fine Aggregate to Degradation by Abrasion in the Micro-Deval	D7428/LS-619*
Accelerated Mortar Bar Test	A23.2-25A/LS-620***
Resistance of Concrete to Rapid Freezing and Thawing	C666

3.2 The Superpave Aggregate Consensus Properties tests are listed in Table 2.

Table 2 - Superpave Aggregate Physical Property Tests

Test	Test Method (Note 1)
Determination of the Percentage of Fractured Particles in Coarse Aggregate	D5821*
Uncompacted Void Content of Fine Aggregate	T304/LS-629*
Flat and Elongated Particles in Coarse Aggregate	D4791*
Plastic Fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test	D2419/T176*

3.3 Laboratories conducting Soils Physical Properties Tests are evaluated for tests specified in Table 3.

Table 3 – Soils Physical Property Tests

Test	Test Method (Note 1)
Particle Size Analysis of Soils	T88/LS-702*
Liquid Limit, Plastic Limit and Plasticity Index	D4318/LS-703 & LS-704*
Specific Gravity of Soils	D854/LS-705*
Compaction Characteristics of Soils-Standard Effort (referred to in Ontario as Moisture-Density Relationship)	D698/LS-706*
Compaction Characteristics of Soils-Modified Effort (D1557 is not applicable to ON labs)	D1557
Determination of Permeability of Granular Soils	AASHTO T215/LS-709

Note 1: Test Methods are written by the following organizations:

- “C” and “D” are ASTM,
- “LS” are MTO
- “R” and “T” are AASHTO
- “A” are CSA

Note 2: The asterisks indicate:

- * Proficiency testing and laboratory inspection are required. No asterisk indicates only laboratory inspection is required.
- ** Proficiency testing, laboratory inspection and a CCIL certified PN Analyst are required
- *** Proficiency testing and laboratory inspection are required for Ontario laboratories. Laboratories outside Ontario require laboratory inspection only.

3.4 The Aggregate Physical Property Laboratory must keep up with any changes to these test methods and procedures and update the laboratory manuals and procedures accordingly.

4.0 Proficiency Sample Testing

Where proficiency testing is required, the laboratory must participate and attain CCIL approved satisfactory ratings, annually, in the Aggregate Proficiency Sample Testing Program, for the tests for which it wishes to be certified. Proficiency testing must be carried out using equipment installed in the permanent or mobile laboratory facility for which certification is being sought.

APPENDIX A-10

REQUIREMENTS FOR ASPHALT AND AGGREGATES TECHNICIAN CERTIFICATION

1.0 - Hot Mix Asphalt (HMA) Laboratory Technician

1.1 General The “Certified Asphalt Technician” is the generic title given to the asphalt technician that includes a basic knowledge and hands-on experience in hot mix asphalt laboratory testing methods.

1.2 Qualification The minimum academic qualification and experience required are based on the criteria listed in Table 1.

Table 1: Academic Qualification and Experience Criteria

Academic Qualifications	Experience (Years) *
High School Diploma**	3
College/University, non-technical Diploma	2
College/University Technology Diploma	1

Notes:

- * Number of seasons in construction with a minimum of 6 months continuous hands on related experience in each category
- ** Previous work experience will be considered for applicants who do not possess a High School Diploma

1.2.1 Asphalt technicians applying for certification must have documented hands-on experience in various hot mix asphalt laboratory testing methods while meeting minimum qualifications listed in Table 1.

1.2.2 The Certified Asphalt Technician must participate in the required inter-laboratory proficiency testing program as well as the required testing during the laboratory inspections.

1.3 CCIL Certified HMA Laboratory Technician Types

1.3.1 CCIL offers two types of certified HMA technicians, depending on laboratory of employment certification:

- Type 1. HMA Certified Marshall and Superpave Laboratory Technician**
- Type 2. HMA Certified Marshall Only Laboratory Technician**

1.3.2 New Technicians employed by CCIL Certified Marshall and Superpave laboratories must apply for Type 1.

1.3.3 New Technician employed by CCIL certified Marshall ONLY laboratories can only apply for Type 2.

1.3.4 New Type 1 technicians seeking certification must attend the CCIL HMA Technician Certification Program in its entirety and pass all components of the examinations.

1.3.5 New Type 2 technicians seeking certification for Marshall only must participate in the certification program in its entirety. However, participation in the practical and written examinations will be focused only on Marshall related topics.

Note: The CCIL HMA technician certification program includes comprehensive examinations both practical and written in all related Marshall and Superpave test procedures. The written component also includes in part calculations pertaining to the various test methods. As this is not an asphalt training course, CCIL does not supply reference notes, books, test standards or any other related printed materials. Technicians participating in the CCIL HMA certification program are encouraged to take Marshall and/or Superpave training course(s), if needed, for skill enhancement prior to participation in the CCIL HMA certification program.

1.3.6 A technician employed at a CCIL certified asphalt laboratory and currently holding valid Marshall or a valid Marshall and Superpave card may renew the card as usual through successful participation in the written examination overseen by CCIL personnel every 5 years.

1.4 Certification Requirements

1.4.1 The Type 1 Asphalt Technician must complete certification examinations and obtain passing grades on procedures listed in CCIL LC 101, Appendices A-2 through to A-5, as well as demonstrating proficiency in the test procedures in Table 2.

Table 2: Practical Examination Requirements

Test	Test Method (Note 1)
Sample Preparation	C702, LS-600
Preparation of Marshall Specimens	D6926/LS-261
Bulk Specific Gravity of Compacted Asphalt Mixes Using Saturated Surface-Dry Specimen	D2726/T166/LS-262
Theoretical Maximum Relative Density of Bituminous Paving Mixtures	D2041/LS-264
Marshall Stability and Flow of Bituminous Mixtures	D6927/LS-263
Percent Compaction of Compacted Bituminous Paving Mixtures	ATT-67/LS-281/LS-287
Quantitative Extraction of Asphalt Cement from Bituminous Paving Mixtures <ul style="list-style-type: none"> • Using either Solvent Methods and/or • Ignition Furnace 	D2172/LS-282 and/or D6307/LS-292/ATT-74
Sieve Analysis of Extracted Aggregates	D5444/LS-282/LS-292
Preparing and Determining the Density of Hot Mix Asphalt Specimens by Means of the Superpave Gyratory Compactor	T312/LS-313 (Note 2)

Note 1: Test Methods are publications of the following organizations:

- “C” and “D” are ASTM,
- “LS” are MTO
- “T” are AASHTO
- “ATT” are Alberta Transportation

Note 2: This test does not apply for Type 2 Asphalt Technician Certification

1.4.2 The Type 2 Asphalt Technician employed by Marshall only laboratories must complete certification examinations, and obtain passing grades on procedures listed in CCIL LC 101, Appendices A-2 and A-4. This technician type must also demonstrate proficiency in all the test procedures in Table 2 except for Sample Preparation using Gyratory Compactor as per Note 2.

2.0 Aggregate Laboratory Technician

2.1 Qualification

Certification as an aggregate laboratory technician is available to any person who has been trained in the applicable tests in Table 3 and carries out aggregate laboratory testing on a regular basis.

2.2 Certification Requirements

The technician must demonstrate proficiency in the Type C test procedures in Table 3 in the presence of a CCIL inspector:

Table 3: PRACTICAL EXAMINATION REQUIREMENTS

AB, SK, YT		BC, MB, NB, NL, NS	ON, QC	
ASTM Standards			MTO Laboratory Testing Manual	
Reducing Samples of Aggregate to Testing Size	C702	C702	Dry Preparation of Aggregates for Determination of Physical Constants	LS-600
Material Finer than 75µm (No. 200) in Mineral Aggregates by Washing	C117	C117	Material Finer than 75µm in Mineral Aggregates by Washing	LS-601
Sieve Analysis of Fine and Coarse Aggregates	C136	C136	Sieve Analysis of Aggregates	LS-602
Determining the Percentage of Fractured Particles in Coarse Aggregate	D5821	D5821	Determination of Percent Crushed Particles in Processed Coarse Aggregate	LS-607
Flat Particles, Elongated Particles or Flat and Elongated Particles in Coarse Aggregate	Not Applicable	D4791	Determination of Percent of Flat and Elongated Particles in Coarse Aggregate	LS-608
Not Applicable			Amount of Percent Asphalt-Coated Particles	LS-621

3.0 Petrographic Analyst Technician

3.1 Qualifications

Certification as a petrographic analyst technician is available to any person who has been trained by an expert in the field and carries out the LS-609 “Procedure for Petrographic Analysis of Coarse Aggregate”: on a regular basis. The technician must meet the Certification Requirements listed below.

3.2 Certification Requirements

CCIL Certification of a Petrographic Analyst Technician requires:

1. Declaration of education supported by copies of University/College diplomas OR transcripts
2. Resume of employment training and practical experience
3. On-going participation in the annual MTO Aggregate and Soil Proficiency Sample Testing Program for LS-609 “Procedure for Petrographic Analysis of Coarse Aggregate”:
4. Submission of a completed CCIL “Petrographic Analyst Application and Qualification Criteria” form, which can be downloaded from CCIL’s website at www.ccil.com under “Petrographic Certification”
5. For new applicants and for certified petrographic analysts that are required to do so by the Certification Program Manager, full participation in the CCIL Petrographic Analysis Certification Workshop. Participants must obtain passing grades on the written exams and for the analysis of reference samples.