



Canadian Council of Independent Laboratories  
Conseil canadien des laboratoires indépendants

**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).

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## 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 overall costs involved.<sup>1</sup>

#### 1.2 Reference Material

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

#### 1.3 Definitions

- Laboratory: a workplace that performs one or more of the following activities:
  - testing.
  - calibration
  - sampling; associated with subsequent testing or calibration.
- Permanent Laboratory: a laboratory located in a non-movable structure on a fixed foundation.
- Mobile Laboratory: a laboratory located in a movable trailer capable of being relocated, without a fixed foundation and usually connected to on-site utilities.
- Certification: an independent assessment and attestation that a laboratory has met the specified requirements as identified by the CCIL Certification Program Administration Committee (CPAC) and CCIL Laboratory Certification documents.
- Engineering Manager: the Laboratory shall employ an Engineering Manager who meets the requirements of the applicable Appendices of this document
- Laboratory Supervisor: the laboratory shall employ a Laboratory Supervisor who meets the requirements of the applicable Appendices of this document

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<sup>1</sup> The annual fees are determined by the CCIL Board of Directors

<sup>2</sup> 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

#### **1.4     Laboratory Categories**

- Asphalt Mix Design – Type A (Marshall Method and/or Superpave Method)
- 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 (BOD) of CCIL is responsible for

- The overall management of CCIL and approval of corporate wide procedures and policies.
- The appointment of the Certification Program Manager (CPM), ensuring the CPM is qualified and a Professional Engineer.

#### **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 program. 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 Asphalt and Aggregates Certification Program Administration Committees (CPACs) and for determining the annual fees assessed to applicants and the certified laboratories. The Executive Committee, in consultation with the CPAC, shall have final judgment 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 reflect 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 CPM. The CPACs provide technical direction to the CPM for delivering the programs.

## 4.2 Duties and Responsibilities of CPAC

- 4.2.1 The Asphalt and Aggregates CPACs address all potential conflicts of interest as identified by the CPM and refer the issues to the Executive Committee as necessary.
- 4.2.2 The Asphalt and Aggregates CPACs are responsible to convene a subcommittee to hear any appeals by laboratories on certification decisions made by the CCIL Certification Office.
- 4.2.3 The Asphalt and Aggregates CPACs monitor an on-going laboratory inspection program as conducted by the CPM. The Asphalt and Aggregates CPACs review the reports from the CPM including actions taken by the CPM 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 CPM for approval by the CPACs.
- 4.2.4 The Asphalt and Aggregates CPACs are responsible to discuss and approve the recommendation of the CPM for the mini correlations to various laboratories, as appropriate.
- 4.2.5 The Asphalt and Aggregates CPACs are responsible to discuss and approve the recommendations of the CPM 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 Asphalt and Aggregates 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 CPM and/or his/her designate attend the CPAC meetings, however, are non-voting. 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 (CPM)

The CPM is retained by the CCIL. In carrying out his/her duties, the CPM represents the CCIL and is responsible to the CPACs for the following tasks:

## 5.1 General Duties

The CPM 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 CPM 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 CPM is also responsible for making recommendations for withdrawal of certification to the CPACs.

5.2.2 The CPM carries out his/her 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 CPM:

- a. Prepares the terms of reference and specifications for annual correlation sample preparation;
- b. evaluates and recommends the selection of laboratories to carry out the preparation of the correlation samples to CPAC;
- c. oversees correlation sample preparation to ensure that it is in conformance with the specifications;
- d. oversees the quality assurance testing of the correlation samples to ensure that the samples are suitable for distribution to the laboratories;
- e. oversees the distribution of the correlation samples to the laboratories;
- f. 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;
- g. receives, records, summarizes, evaluates, and publishes the results of annual correlation testing program;
- h. based on the results of the annual correlation testing program, makes a decision regarding the certification of laboratories;
- i. evaluates and recommends mini correlation testing where appropriate;
- j. issues mini correlation notifications to laboratories as appropriate after discussion and approval by CPAC; and
- k. 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 CPM carries out laboratory inspections in accordance with this document and 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 CPM 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, shall be in strict confidence between the laboratory involved, CCIL personnel, and the members of the Board of Directors and various CPACs Committees that may have access to confidential information through their activities in the certification process, such as Appeals and Disputes. All CCIL Board and Committee members that have access to proprietary and confidential information must agree to comply with the CCIL Confidentiality and Impartiality Policy by signing the CCIL “Personnel/Contractor Confidentiality and Impartiality Declaration Form” Appendix C, before access to such information is provided.
- 5.5.2 The CPM shall ensure that the confidentiality of the program is always maintained. Specifically, the CPM shall ensure 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 will be required to have access to sufficient information to make an informed decision.

#### **5.6 Conflicts of Interest:**

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

### **6.0 Certification Program**

#### **6.1 Specific Laboratory Certification Requirements**

The specific requirements for the various laboratory certification categories are provided in Appendix A-1 to A-10

- Certification Program Requirements, List of Appendices: Appendix A-1
- Asphalt Mix Compliance Laboratories – Marshall Method (Type B); Appendix A-2

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

## 6.2 Laboratory Compliance Report

6.2.1 The laboratory shall agree to biennial laboratory inspections or as required by the CCIL CPM 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 management systems
- Equipment
- Traceability & calibration
- Facilities and environment
- Demonstrations of all or selected test methods
- Review of reports
- 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 an inspection, the Inspector will provide the laboratory with a Compliance Report that outlines the results of the inspection. If a certified laboratory does not take corrective action and rectify all nonconformances within thirty calendar days of the inspection, the laboratory's certification is subject to suspension by the Certification Program Manager in accordance with "CCIL procedure for Suspension, Withdrawal, Appeals and Disputes of Certification".

6.2.3 Laboratory inspections are scheduled to provide inspection for all new applicants as soon as possible in the first year with a minimum requirement of one inspection or subsequent inspection for all participants every two calendar years. A satisfactory inspection is required prior to initial certification and is a condition for continuing certification.

6.2.4 The certification process must be completed within one year of the initial inspection of the laboratory. If the process is not completed within one year, CCIL will cancel the application, and the laboratory may reapply for certification at a future date.

6.2.5 Laboratories to be inspected are scheduled by the CPM or on the recommendation of the Asphalt and Aggregates 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 the Engineering Manager, supervisory personnel, and technicians. The Organization Chart will be verified during the inspections to ensure that it is up to date and includes the personnel identified by management. The CPM must be advised within 30 days 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, prior to their inspection date, 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. A list of active technicians must be verified during biennial inspections.

## 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 (QMS) that is aligned with the principles of the current version of ISO/IEC 17025.

The laboratory shall maintain documentation of the QMS which, as a minimum, includes:

- Details of management policy and commitment
- Organization structure
- Management and laboratory personnel
- Documentation of the training of technicians
- Inventory of test equipment
- Procedures for the maintenance and calibration of equipment
- Maintaining and up-to-date record of standards, specifications and test methods
- Control of documents and data
- Control of test samples
- Control of non-conforming products
- Corrective and preventative actions and improvements
- Laboratory certification documentation
- Results and summary of internal audits.

The laboratory shall conduct an internal audit not less frequently than once a year of its operations and the QMS by a person, or persons, not responsible for the original test results.

A document summarizing the deficiencies from an inspection and corrective/preventative action taken in response shall be included in the QMS and available for review by CCIL staff.

## **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. Test equipment cannot be shared, borrowed, or rented.

### **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 CPM 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 verified/calibrated before being put into service. The laboratory shall have up-to-date certificates available to CCIL 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, a certified laboratory shall provide satisfactory evidence of correlation via the annual CCIL Inter-laboratory Correlation Test Program.

## **6.8 Sub-Contracting**

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. At a minimum, the laboratory sub-contracting the testing must itself have the equipment listed in the test

method and employ a certified technician for all the test methods for which the laboratory is certified.

## **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 CPM, 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 record is to be digitally signed and submitted by the Engineering Manager responsible for the laboratory.
- 6.10.3 New laboratories must complete and submit the Questionnaire to the CPM before CCIL can issue certification.

## **6.11 Application and Certification Processes**

Information on the application and certification processes can be found on the CCIL website ([www.ccil.com](http://www.ccil.com)) and the CCIL portal ([portal.ccil.com](http://portal.ccil.com)).

## **6.12 Laboratory Re-location or Sale of Facilities**

- 6.12.1 The Certification Program Manager shall be advised in writing at least 30 days in advance of a relocation or transfer of ownership.
- 6.12.2 When a Permanent Laboratory is relocated, the laboratory shall be audited at the new location. A laboratory certificate for the new location will be issued upon approval of the audit. During the interim period the Certification of the laboratory shall remain in force.
- 6.12.3 When a certified Mobile Laboratory is moved from one location to another, re-inspection and re-certification are not required.

- 6.12.4 When a CCIL certified laboratory is purchased by a corporate entity that owns one or more CCIL certified aggregate or asphalt laboratories (as applicable), the laboratory which changed ownership will be deemed to continue to be certified pending an audit. The time of the audit is at the discretion of the Certification Program Manager, based on continuity of location, equipment and staff.
- 6.12.5 When a CCIL certified laboratory is purchased by a corporate entity that does not own a CCIL certified aggregate or asphalt laboratory (as applicable), the Certification Program Manager will determine, based on continuity of location, equipment, and staff, whether certification will continue pending an audit or will be revoked. Where certification is revoked, the laboratory will be considered as a new laboratory by CCIL and the new owner must initiate the certification process in accordance with 6.0. The laboratory will be audited at the earliest opportunity and must complete all requirements before a new certificate will be issued.

## **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 CPM, 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 CPM 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 CPM. 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 of 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 When participants successfully meet the program requirements, a technician card will be issued 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 new company of employment for technicians who are transferred. 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 technician is certified.

### **8.4 Loaning of Certified Technicians**

Based on the provincial jurisdiction/owner, a certified asphalt technician working for a CCIL certified laboratory may be loaned to another certified laboratory, or a new laboratory seeking certification, without any changes to the status of his/her certification. If the loaned technician holds a higher certification than that of the laboratory acquiring him/her, the technician's certification is limited to the test methods for which the laboratory is certified. If the laboratory acquiring the loaned technician has a different corporate entity than the loaning laboratory, the Engineering Manager of the acquiring laboratory shall advise the CCIL Certification Office in writing of the arrangement. The notification must include the planned duration of the loan. The work performed by the loaned technician shall be under the supervision of the Engineering Manager of the acquiring laboratory.

### **8.5 Shared Technicians**

Companies having multiple certified laboratories may share technicians between their locations. A home laboratory must be designated for every technician. Every certified laboratory must be the home laboratory for one or more technicians. The list of certified technicians for a laboratory with shared technicians must include all the technicians who work in the laboratory at any time and identify their home laboratory.

## **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** – Requirements for Asphalt Mix Compliance Laboratories – Marshall Method (Type B)

**Appendix A-3** – Requirements for Asphalt Mix Compliance Laboratories – Superpave Method (Type B)

**Appendix A-4** – Requirements for Asphalt Mix Design Laboratories – Marshall Method (Type A)

**Appendix A-5** – Requirements for Asphalt Mix Design Laboratories – Superpave Method (Type A)

**Appendix A-6** – Requirements for Laboratories Testing Penetration of Recovered Asphalt Cement (Type E)

**Appendix A-7** – Requirements for Laboratories Testing Performance Graded Asphalt Cement (Type F)

**Appendix A-8** – Requirements for Aggregate Quality Control Laboratories (Type C)

**Appendix A-9** – Requirements for Aggregate Physical Property Laboratories (Type D)

**Appendix A-10** – Requirements for Asphalt and Aggregate Technician Certification

## Appendix A-2

### Requirements for Asphalt Mix Compliance Laboratories

#### 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 Engineering Manager**

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 CPM) 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 Laboratory Supervisor**

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 CPM).

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 laboratory supervisor. 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. During the training period of a technician, the test report shall include the name of the certified technician responsible for the testing and the name of the trainee.

2.4 The Laboratory Supervisor or the Engineering Manager will be responsible for reporting the test results to the 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-621
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 (if required)	D1188/LS-306 or D6752
Marshall Stability and Flow of Bituminous Mixtures (if required See Note 1)	D6927
Theoretical Maximum Relative Density of Bituminous Paving Mixtures (if required, see Note 1)	D2041/LS-264
Percent Air Voids in Compacted Dense Bituminous Pavement Mixtures (if required, see Note 1)	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 (if required, see Note 1)	ATT-67/LS-287
Quantitative Extraction of Asphalt Cement from Bituminous Paving Mixtures <ul style="list-style-type: none"> <li>- Using either Solvent Methods and/or</li> <li>- Ignition Furnace</li> </ul>	D2172/LS-282 and/or D6307/LS292
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” is MTO
- “AI” is Asphalt Institute
- “ATT” is Alberta Transportation, and
- “T” or “R” is AASHTO

3.2 The laboratory must keep up with any changes to these methods and procedure 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**

<b>Test</b>	<b>Test Method (Note 3)</b>
Preparation of Bituminous Materials	D5/LS-200
Kinematic Viscosity of Asphalt	D2170/LS-202
Resistance to Stripping of Asphalt Cement in Bituminous Mixtures	D4867
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 Laboratories**

#### **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.

#### **2.0 Staff**

##### **2.1 Engineering Manager**

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 CPM) 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 Laboratory Supervisor**

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 CPM).

**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 laboratory supervisor. There shall be at least one CCIL certified laboratory technician who has met the requirements of the CCIL Supervisor Asphalt Technician Certification Program, working in the laboratory while that laboratory is in operation. During the training period of a technician, the test report shall include the name of the certified technician responsible for the testing and the name of the trainee.

**2.4** The Laboratory Supervisor 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**

Test	Test Method (Note 2)
Preparing and Determining the Density of Hot Mix Asphalt Specimens by Means of the Superpave Gyratory Compactor	T312/LS-313
Bulk Specific Gravity of Compacted Asphalt Mixes Using Saturated Surface-Dry Specimen	D2726/LS-262
Bulk Relative Density of Compacted Bituminous Mixes Using Either Coated Specimens or Using Automatic Vacuum Sealing Equipment (if required)	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 (if required, See Note 1)	AI MS-2/LS-266
Percent Compaction of Compacted Bituminous Paving Mixtures	ATT-67/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/LS292
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” is MTO
- “AI” is Asphalt Institute
- “ATT” is Alberta Transportation, and
- “T” is AASHTO

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

**3.3** In addition to these tests, an Asphalt Mix Compliance Laboratory using Superpave methods should 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. Examples of such tests are listed in Table 2.

**Table 2 – Additional Tests**

<b>Test</b>	<b>Test Method (Note 2)</b>
Preparation of Bituminous Materials	D5/LS-200
Kinematic Viscosity of Asphalt	D2170/LS-202
Resistance to Stripping of Asphalt Cement in Bituminous Mixtures	D4867
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 Laboratories**

#### **Marshall Method (Type A)**

#### **1.0 General**

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 Engineering Manager**

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 CPM) and a full-time employee of the asphalt laboratory, and have at least five years of experience in the inspection and testing of construction materials. All Marshall mix designs submitted to clients shall be approved by this person.

##### **2.2 Laboratory Supervisor**

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 of 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 CPM).

**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 laboratory supervisor. 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. During the training period of a technician, the test report shall include the name of the certified technician responsible for the testing and the name of the trainee.

**2.4** The Laboratory Supervisor 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)**

<b>Test</b>	<b>Test Method (Note 1)</b>
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 (if required)	D1188/LS-306 or D6752
Marshall Stability and Flow of Bituminous Mixtures	D6927
Theoretical Maximum Relative Density of Bituminous Paving Mixtures	D2041/LS-264
Percent Air Voids in Compacted Dense Bituminous Paving 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	D2172/LS-282 and/or D6307/LS292
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 75um 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” is MTO
- “AI” is Asphalt Institute
- “ATT” is Alberta Transportation, and
- “T” or “R” is 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)
Preparation of Bituminous Materials	D5/LS-200
Kinematic Viscosity of Asphalt	D2170/LS-202
Resistance of Compacted Asphalt Mixtures to Moisture-Induced Damage	D4867
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 Laboratories**

#### **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 Engineering Manager**

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 Profession Engineer (or equivalent as approved by the CPM) and a full-time employee of the asphalt laboratory and have at least five years of experience in the inspection and testing of construction materials. All Superpave mix designs submitted to clients shall be approved by this person.

##### **2.2 Laboratory Supervisor**

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 of 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 CPM).

**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. During the training period of a technician, the test report shall include the name of the certified technician responsible for the testing and the name of the trainee.

**2.4** The Laboratory Supervisor 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, manual 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**

<b>Test</b>	<b>Test Method (Note 2)</b>
Superpave Volumetric Mix Design	LS-309/R35
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 (if required)	D1188/LS-306 or D6752
Resistance of Compacted Asphalt Mixtures to Moisture-Induced Damage	D4867/T283/LS-283
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 MS-2/LS-266
Draindown Characteristics in Uncompacted Asphalt Mixtures (if required, see Note1)	D6390/LS-310/T305
Percent Compaction of Compacted Bituminous Paving Mixtures	ATT-67/LS-287
Quantitative Extraction of Asphalt Cement from Bituminous Paving Mixtures <ul style="list-style-type: none"> <li>- Using either Solvent Methods and/or</li> <li>- Ignition Furnace</li> </ul>	D2172/LS-282 and/or D6307/LS-292
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 75um 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-603
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	C1252/LS-629
Sand Equivalent/Clay Content of Fine Aggregate	D2419

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

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

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

**3.4** 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 Testing Penetration 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 and/or A-5.

#### **2.0 Staff**

##### **2.1 Engineering Manager**

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 CPM) and a full-time employee of the Asphalt Laboratory and have at least three years' experience in the testing of construction materials.

##### **2.2 Laboratory Supervisor**

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 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 CPM).

**2.3** Technicians employed in the Laboratory shall have the necessary experience to complete the required tests under the direct supervision of the laboratory supervisor. 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. During the training period of a technician, the test report shall include the name of the certified technician responsible for the testing and the name of the trainee.

**2.4** The Laboratory Supervisor or the Engineering Manager will be responsible for reporting the test results to clients.

#### **3.0 Equipment, Manuals and Reporting Procedures**

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

**Table 1 – Penetration Tests on Recovered Asphalt Cement**

<b>Test</b>	<b>Test Method (Note 1)</b>
Penetration of Bituminous Materials	D5/LS-200
Recovery of Asphalt from Solution by Abson Method (see note 2)	D1856
OR	
Recovery of Asphalt from Solution by Rotary Evaporator	D5404/LS-284

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

- “D” is ASTM
- “LS” is MTO

Note 2: Some provincial jurisdictions may not accept the Abson method of recovery, e.g. ON

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

## 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 Engineering Manager**

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 CPM) and a full-time employee of the PGAC Laboratory and have at least three years' experience in the testing of construction materials.

##### **2.2 Laboratory Supervisor**

The direct testing services of the Laboratory will be supervised by a supervisory laboratory technician with at least three year's 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 will keep up with developments in asphalt technology and have C.E.T. designation (or equivalent as approved by the CPM).

**2.3** Technicians employed in the Laboratory shall have the necessary experience to complete the required tests under the direct supervision of the laboratory supervisor. During the training period of a technician, the test report shall include the name of the certified technician responsible for the testing and the name of the trainee.

**2.4** The Laboratory Supervisor or the Engineering Manager will be responsible for reporting the test results to clients.

#### **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 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
Recovery of Asphalt from Solution by Rotary Evaporator	LS-284
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 the Extended Bending Beam Rheometer (BBR) Method	LS-308

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

- “D” is ASTM
- “LS” is 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 owner that are part of their binder testing protocol. Examples of such tests are listed in Table 2.

**Table 2 – Additional PGAC Tests**

<b>Test</b>	<b>Test Method (Note 1)</b>
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

## **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 Engineering Manager**

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 Laboratory Supervisor**

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 CPM. This person shall also be certified by CCIL as being proficient at aggregate testing (Type C technician).

- 2.2.1** Individuals lacking the three years' experience required for a Laboratory Supervisor may apply to the CPM for consideration of past education and work experience. A written examination demonstrating proficiency in all areas of aggregate testing may be administered by the CPM in lieu of the completion of the three years' work experience.
- 2.2.2** A Laboratory Supervisor may supervise more than one laboratory operation and does not need to be physically on-site at all times. However, Laboratory Supervisor must make frequent visits to the laboratory and shall review all test results before they are issued. All certified laboratories where the Laboratory Supervisor supervises multiple locations shall employ at least one

other CCIL certified laboratory technician at each laboratory location. The technician shall have satisfied the requirements of the CCIL Aggregate Technician Certification Program and must work in the laboratory at all times while the laboratory is in operation.

**2.3** Technicians employed in the Laboratory shall have the necessary training and experience to complete the required tests under the direct supervision of the Laboratory Supervisor. All technicians performing Type C testing in a laboratory shall be certified (Type C) as proficient in performing the designated Type C tests on a laboratory certification. During the training period of a technician, the test report shall include the name of the certified technician responsible for the testing and the name of the trainee. Certification of the trainee should be scheduled at the earliest available date following completion of the training. All Aggregate Type C laboratories shall employ at least one Type C certified technician who is a permanent staff at the laboratory location. All aggregate testing performed under the CCIL certification program must be performed by CCIL certified aggregate technicians.

**2.4** Once the laboratory technicians have passed the practical and written exams, the CCIL inspector uploads the technician certification information to the CCIL portal for review and acceptance by the laboratory. After processing and issuing by the CCIL certification office, the technician card(s) will be available for downloading from the Laboratory profile in the CCIL portal. A technician card shall include an expiry date which will be five years from the date of successful examination. 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.

**2.5** The Laboratory Supervisor 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**

Jurisdiction	AB, SK, YT	BC, MB, NB, NL, NS, PE	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 75um (No. 200) in Mineral Aggregates by Washing	C117	C117	Material Finer than 75um in Mineral Aggregate 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 the Amount of Asphalt-Coated Particles in Coarse Aggregate	LS-608
Not Applicable			Determination of the Amount of Asphalt-Coated Particles in Coarse Aggregate	LS-621

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

## **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 laboratory to be certified for Petrographic Analysis of Coarse Aggregate, LS-609, the laboratory must be Type C certified and meeting Type D certification requirements for LS-609, including proficiency testing and inspection, and the laboratory 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 Engineering Manager**

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 CPM, and a full-time employee of the aggregate laboratory, and have at least five years of experience in the inspection and testing of construction materials.

##### **2.2 Laboratory Supervisor**

The direct testing services of the laboratory will be supervised by a supervisory laboratory technician with at least five years of 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 a 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 CPM. This person shall also be certified by CCIL as being proficient at aggregate testing (Type C technician).

**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 laboratory supervisor. All technicians performing Type C testing in a laboratory shall be certified (Type C) as proficient in performing the designated Type C tests on the laboratory certification. During the training period of a technician, the test report shall include the name of the certified technician responsible the testing and the name of the trainee. Certification of the trainee should be scheduled at the earliest available date following completion of the training. All Aggregate Type D laboratories shall employ at least one Type C certified technician who is a permanent staff at the laboratory location. All aggregate testing performed under the CCIL certification program must be performed by CCIL certified aggregate technicians.

**2.4** The Laboratory Supervisor 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**

<b>Test</b>	<b>Test Method (Note 1)</b>
Scaling Resistance of Concrete Surfaces Exposed to a De-icing Chemicals	C672/LS-412
Resistance to Degradation of Coarse Aggregate by Abrasion and Impaction 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 – 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	C1252/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

**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

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

- “C” and “D” is ASTM
- “LS” is MTO
- “R” and “T” are AASHTO
- “A” is 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.

Note 3: Labs seeking certification for LS-702 must also participate in both: LS703,704 and LS-705.

**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.

**3.5** A Type D Aggregate Physical Property Laboratory certified for A23.2-26A/LS-615 Determination of Potential Alkali-carbonate Reactivity of Carbonate Rocks by Chemical Composition must be able to complete or have documented access to a laboratory able to complete the chemical analysis, including the SRM analysis certificate, as referenced in the test method.

#### **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 who includes 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 Technical Diploma	1

Notes:

\* Number of seasons in construction with a minimum of 6 months of 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 three types of certified HMA technicians, depending on the laboratory of employment certification:

**Type 1. HMA Certified Marshall and Superpave Laboratory Technician**

**Type 2. HMA Certified Marshall Only Laboratory Technician**

**Type 3. HMA Certified Superpave 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 technicians employed by CCIL certified Marshall ONLY laboratories can only apply for Type 2.

**1.3.4** New technicians employed by CCIL certified Superpave ONLY laboratories can only apply for Type 3.

**1.3.5** New technicians seeking certification must pass all practical and written examinations. For the purpose of the above, a new technician is defined as a person who was not previously certified or a previously CCIL certified technician whose card has expired.

**1.3.6** New technicians seeking certification for Marshall or Superpave only who attend the CCIL HMA Technician Certification Program must participate in the certification program in its entirety. However, participation in the practical and written examinations will be focused only on Marshall or Superpave-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 courses, if needed, for skill enhancement prior to participation in the CCIL HMA certification program.

**1.3.7** A technician employed at a CCIL certified asphalt laboratory and currently holding a valid card may renew the card through successful participation in the written examination overseen by CCIL personnel every 5 years.

**1.3.8** A certified technician who has been loaned or transferred to a laboratory from another certified laboratory shall only perform tests that he/she is qualified to perform. The loaned technician shall not participate in any CCIL proficiency testing that may be required of the acquiring laboratory.

**1.3.9** A certified technician who has been permanently transferred to a certified laboratory from another certified laboratory, and who has a lower level of certification than the new laboratory, may retain the lower level of certification provided that the laboratory has one or more technicians whose certification is the same level as that of the laboratory.

## 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 A-5, as well as demonstrate proficiency in the test procedures in Table 2.

**Table 2 – Practical Examination Requirements**

Test	Test Method (Note 1)
Sample Preparation	C702, LS-600, D6926/LS-261/LS-313/T312
Preparation of Marshall Specimens	D6926/LS261 (Note 3)
Bulk Specific Gravity of Compacted Asphalt Mixes Using Saturated Surface-Dry Specimen	D2726/LS-262
Theoretical Maximum Relative Density of Bituminous Paving Mixtures	D2041/LS-264
Marshall Stability and Flow of Bituminous Mixtures	D6927 (Note 3)
Percent Compaction of Compacted Bituminous Paving Mixtures	ATT-67/LS-287
Quantitative Extraction of Asphalt Cement from Bituminous Paving Mixtures <ul style="list-style-type: none"> <li>• Using either Solvent Methods and/or</li> <li>• Ignition Furnace</li> </ul>	D2172/LS-282 and/or D6307/LS-292
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 written by the following organizations:

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

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

Note 3: These tests do not apply for Type 3 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 the test procedures for the specific provincial jurisdiction/owner in Table 2 except for Sample Preparation using Gyratory Compactor as per Note 2.

**1.4.3** The Type 3 Asphalt Technician employed by Superpave only laboratories must complete certification examinations and obtain passing grades on procedures listed in CCIL LC-101, Appendices A-3 and A-5. This technician type must also demonstrate proficiency in the test procedures in Table 2, except for Preparation of Marshall Specimens and Marshall Stability and Flow as per Note 3.

## 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 all persons who carry out aggregate laboratory testing on a regular basis are to be certified.

### 2.2 Certification Requirements

The technician must complete certification examinations and obtain passing grades as well as demonstrate proficiency in the Type C test procedures in Table 3 in the presence of a CCIL inspector.

**Table 3 – Practical Examination Requirements**

Jurisdiction	AB, SK, YT	BC, MB, NB, NL, NS, PE	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 75um (No. 200) in	C117	C117	Material Finer than 75um in Mineral Aggregate by	LS-601

Mineral Aggregates by Washing			Washing	
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 for a certified aggregate laboratory. 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](http://www.ccil.com) under “Petrographic Certification.”
5. For new applicants and for certified petrographic analysts that are required to do so by the CPM, full participation in the CCIL Petrographic Analysis Certification Workshop. Participants must obtain passing grades on the written exams and for the analysis of training and reference samples
6. Recertification requires attendance and a passing grade at the certification portion of the CCIL Petrographic Analysis Certification Workshop.