The Voice Of Independent Canadian Laboratories
La voix des laboratoires indépendants canadiens

Laboratory Certification (LC) Document

LC-101

CCIL Asphalt and Aggregate Laboratory and Technician Certification Programs

1.0 Introduction

1.1 Background

The overall objective of inspecting and testing asphalt pavement materials i.e. Hot Mix Asphalt (HMA) and granular base is to determine whether or not their characteristics and qualities as used in construction, comply with applicable standards and specifications.

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) has upgraded the requirements of the CCIL Laboratory Certification Programs.

The CCIL certification programs are open to all bituminous and aggregate testing laboratories providing design and/or quality control services for road construction through an annual fee to cover the overall costs involved[1].

1.2 Reference Material

1) CAN-P-4D ISO/IEC 17025-2000 General Requirements for the Competence of Calibration and Testing Laboratories [2]
2) ISO/IEC Guide 2-1996 Standardization and Related Activities - General Terms and their Definitions
3) ASTM E 994-95 Standard Guide for Laboratory Accreditation Systems (withdrawn or replaced)
4) ASTM E 548-94 Standard Guide for General Criteria Used for Evaluating Laboratory Competence (withdrawn/replaced)
5) ASTM E 1301-95 (2003) Standard Guide for Development and Operation of Laboratory Proficiency Testing Programs

1.3 Definitions

1) Laboratory: a workplace designated for scientific testing and analysis having all the necessary equipment, facilities and utilities.
2) Permanent Laboratory: a laboratory located in a non-moveable structure on a fixed foundation.
3) Mobile Laboratory: a laboratory located in a moveable trailer capable of being relocated, without a fixed foundation and usually connected to on-site utilities.

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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
1200-45 O'Connor Street
Ottawa, Ontario, K1P 6N7

4) Certification: to attest to meeting standards identified by CCIL Certification Program Administration Committee (CPAC) and CCIL Laboratory Certification (LC) document.

1.4 Laboratory Categories

Asphalt Mix Design (Marshall Methods and/or Superpave Methods)
Asphalt Mix Compliance (Marshall Methods and/or Superpave Methods)
Penetration of Asphalt Cement Recovered from Hot Mix
Performance Graded Asphalt Cement
Aggregate Quality Control
Aggregate Physical Properties
(Please see list in Appendix A-0)

2.0 Certification Program Administration Committees (CPACs)

The Certification Program Administration Committees (CPACs) establish, review, and revise as necessary the technical criteria for the core elements of the Certification Program including, but not necessarily limited to:

1) inter-laboratory correlation testing;
2) conformance with equipment and personnel requirements (standardization);
3) in situ inspections and audits to verify laboratory claims respecting personnel, testing procedures, equipment and calibrations, and
4) quality manual and proof of implementation and use

CPAC shall provide direction to the Program Manager who is responsible for administering the program.

Members of CPAC must be notified at least one week in advance of any meetings. A quorum shall be formed where there is a minimum of 66% of members in attendance. If a quorum is not established, the chairman shall adjourn the meeting with no business being transacted.

The CPAC shall be responsible for conducting an annual inter-laboratory correlation testing program for laboratories seeking certification. With assistance from the Program Manager, CPAC shall select laboratories to prepare correlation samples and ensure that the sample preparation and distribution conforms to the specified quality requirements and time schedules set by CPAC. The Program Manager acting on behalf of the CCIL Executive will issue contracts for these services.

The CPAC will, on behalf of the CCIL, review the inter-laboratory test results together with the conformance report on the laboratories based on meeting equipment, personnel and procedural criteria. If the applicant laboratory successfully meets the correlation testing program requirements and conforms to equipment, personnel and procedural standards, the CPAC will instruct CCIL through the Program Manager to issue a Laboratory Certificate of Conformance. If there is a deficiency in test results the laboratory will be

required to undertake a mini-correlation program[2] and repeat any tests that may have been unsatisfactory. If there are any deficiencies in equipment, personnel or other specified areas, the laboratory will be given 90 days to demonstrate their ability to rectify the problem to the satisfaction of the CPAC. Laboratory confidentiality will be maintained throughout this review process.

The CPAC will be responsible for reviewing the Certification Program annually and ensuring that program objectives and standards are maintained. In addition, a list of certified laboratories will be published annually. Laboratories successfully completing mini-correlation testing by the publishing date will be included in this list. Laboratories successfully completing testing after the publication date will receive a letter of certification. In both cases the successful laboratories will be listed on the CCIL web site **www.ccil.com.**

The CPAC shall direct and monitor an on-going laboratory inspection and audit program as conducted by the Program Manager. CPAC shall review the reports from the Program Manager and initiate appropriate action in cases of non-conformance to certification requirements. In cases of continued non-conformance, recommendations for suspension or removal of certification shall be made to the CPAC for action.

All information pertaining to the Certification Program, with the exception of the listing of certified laboratories, shall be in strict confidence between the specific laboratory involved and the Program Manager and/or the Assistant to the Program Manager.

2.1 Asphalt Certification Program Administration Committee (CPAC)

A committee will be responsible to the CCIL for organizing and operating the Program on an annual basis. The composition of the Asphalt CPAC is provided in Appendix A-1.

2.2 Aggregate Certification Program Administration Committee (CPAC)

The Aggregate Certification Program Administration Committee (Aggregate CPAC) will be responsible to the CCIL for organizing and operating the Aggregate Laboratory Certification Program on an annual basis. The composition of the aggregate CPAC is also provided in Appendix A-1.

3.0 Program Manager

The Program Manager shall be retained by the CCIL. In carrying out his duties, the Program Manager shall represent the CCIL and shall be responsible to the Certification Program Administration Committee (CPAC) for the following tasks:

3.1 General Duties

The Program Manager shall:

1) assist the CPAC in carrying out the Certification Programs;
2) liaise with regulatory agencies regarding procedures for testing and designing asphalt mixtures and materials;

3) provide technical support and consultation to certified or applicant laboratories throughout the year.

3.2 Annual Inter-laboratory Correlation Testing Program

The Program Manager shall, with the approval of CPAC:

1) prepare the terms of reference and specifications for annual correlation sample preparation;
2) provide recommendations for and assist in the selection of laboratories to carry out the preparation of the correlation samples;
3) oversee correlation sample preparation to ensure that it is in conformance with the specifications;
4) oversee the quality assurance testing of the correlation samples to ensure that the samples are suitable for distribution to the applicant laboratories;
5) oversee the distribution of the correlation samples to the applicant laboratories;
6) provide 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;
7) receive, record, summarize, evaluate and publish the results of annual correlation testing program;
8) based on the results of the annual correlation testing program, provide recommendations regarding the certification of applicant laboratories;
9) evaluate and recommend mini-correlation testing where appropriate; and
10) receive, record, summarize and evaluate the results of mini-correlation testing and provide recommendations regarding the certification of applicant laboratories.

3.3 Laboratory Inspection Program

The Program Manager, or individual qualified in inspections and audits and reporting to the Program Manager, shall carry out laboratory inspections in accordance with Laboratory Inspection Criteria as recommended by the CPAC and authorized by the CCIL Executive in accordance with the approved budget. Following the laboratory inspection, the Program Manager or his/her designate shall prepare a written report for each laboratory including a completed checklist confirming conformance or non-conformance with CCIL Laboratory Certification Program.

3.4 Confidentiality of the Program

The Program Manager shall ensure that the confidentiality of the program is maintained at all times. Specifically, the Program Manager shall ensure that:

1) the distribution of the annual correlation samples to specific applicant laboratories is not known to the laboratories participating in the preparation of the samples; and
2) the identity of the laboratories under discussion at CPAC meetings is not known to the CPAC member.

3.5 Conflicts of Interest:

As the Program Manager represents the CCIL and the Certification Programs, it is incumbent on the Program Manager to bring all potential conflicts of interest to the attention of the CPAC at the earliest opportunity. The CCIL Board of Directors, in consultation with the CPAC, shall have final judgement on all conflicts of interest.

4.0 General Requirements for Certification in Each Category

4.1 Annual Report

Each participating laboratory shall file an annual report with the Program Manager on behalf of each participating laboratory demonstrating that the laboratory has:

1) specific equipment and general facilities required for the type of certification sought;
2) qualified technical staff required for the type of certification sought; and
3) testing manuals and reporting procedures required for the type of certification sought.

This report is to be signed by the professional engineer, or equivalent manager, responsible for the laboratory, and include a statement that this equipment and staff will be available at the laboratory for the certification period.

4.2 Inter-laboratory Testing Program

The laboratory must participate in the required inter-laboratory testing program on at least an annual basis, for the desired categories of laboratory certification. Proficiency testing must be carried out using equipment installed in the permanent or mobile laboratory facility for which certification is being sought.

4.3 Laboratory Inspection and Conformance Report

The laboratory shall agree to periodic laboratory inspections as required by the CCIL Program Manager or his/her designate. The laboratory inspections shall 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

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.

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.

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

4.3.1 Organization, Management & Personnel

4.3.1.1 Organization

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

4.3.1.2. 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 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.*

4.3.1.3 Personnel

Laboratories are to 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.

4.3.2 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 developed according to ISO 17025. This can be achieved by:

1) 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

2) 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.

4.3.3 Equipment, Records, and On-site Checks

4.3.3.1 Equipment

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

4.3.3.2 Records

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

4.3.3.3 On-Site Checks

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

4.3.4 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 temporary or mobile laboratories.

4.3.5 Calibration and Traceability

4.3.5.1 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.

4.3.5.2 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.

4.3.6 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.

The sub-contracting 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.

4.3.7 Laboratory Re-location or Sale of Facilities

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

When a complete laboratory is moved from its original location and assembled in a new permanent or mobile facility, the Program Manager shall be immediately advised

in writing and a re-inspection by the Program Manager or a CCIL Inspector designated by the Program Manager shall be undertaken. The timing of the re-inspection shall be left to the discretion of the Program Manager. During the interim period the Certification of the laboratory shall remain in force.

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 Program Manager or a CCIL Inspector designated by the Program Manager. Timing of the re-inspection will be left to the discretion of the Program Manager.

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.

4.3.8 Suspension and Appeal

As the result of an on-site inspection, any laboratory found not to comply with the requirements of the program outline will be requested in writing (inspection report letter) to take appropriate action. If the laboratory does not initiate the necessary action within thirty (30) days of the date of the letter, certification will be suspended until the requested action has been taken and verified by the Program Manager.

The laboratory has the right to appeal the suspension in person to a three-man subcommittee made up of the members of CPAC. The Program Manager will also be in attendance. The laboratory will be notified in writing on the decision of the subcommittee within seven (7) days of the appeal hearing.

If after reviewing the appeal and supporting information, this subcommittee decides that certification is justified, 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 is available.

This second level appeal shall be presented in writing to a three-man subcommittee made up of members of the CCIL Board of Directors within thirty (30) days of the date of notification of denial. The latter subcommittee will set a time and date within thirty (30) days of the date of appeal to study the appeal of the laboratory as well as the decision of CPAC.

All costs related to the appeal mechanism will be born by the laboratory.

Lack of timely payment of outstanding fees is grounds for suspension of a laboratory's certification. Suspension of a laboratory's certification after appropriate notice of lack of payment may be invoked by the CCIL Board of Directors.

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

The liability of the CCIL and CPAC shall be limited to the amount of fees paid. In the case of damages incurred as a result of suspension or withdrawal of certification the foregoing parties assume no responsibility.

4.4 Guidelines for Responsibilities and Duties

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

4.4.1 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.

4.4.2 Duties

The following duties are required of the testing laboratory:

1) perform all testing operations in accordance with appropriate standards;
2) call to the immediate attention of the proper authority, any irregularity or deficiency; and
3) 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.

5.0 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 Methods (Type B): Appendix A-2
Asphalt Mix Compliance Laboratory-Superpave Methods (Type B): Appendix A-3
Asphalt Mix Design Laboratory - Marshall Methods (Type A): Appendix A-4
Asphalt Mix Design Laboratory - Superpave Methods (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

6.0 Laboratory Technician Certification Programs

6.1 Background

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) has developed Asphalt and Aggregate Laboratory Certification Programs. These Programs are comprised of four components:

1) inter-laboratory proficiency sample correlation testing;
2) laboratory inspections and audits to verify laboratory claims respecting equipment, personnel and test procedures
3) qualified laboratory personnel; and
4) laboratory quality manual/quality system

As a complement to the laboratory certification CCIL is providing 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.

The 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.

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.

6.2 General Requirements for Technician Certification

The general requirements for technician certification are as follows.

6.2.1 Annual Report

The CCIL Certified Laboratory is required to file an annual report with the Program Manager on behalf of each participating technician demonstrating that he/she has:

1) continued to work in the field of testing commensurate with the Certification Card held; and
2) kept up-to-date with the testing manuals and reporting procedures required.

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

6.2.2 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.

The following duties are those usually performed by the Laboratory Technician:

1) perform all testing in accordance with appropriate standards;
2) call to the immediate attention of the proper authority, any irregularity or deficiency; and
3) 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 and methods used in obtaining samples, the tests performed, the specified values for the measured characteristics, the values obtained, the identification of the work involved, and similar pertinent data.

6.3 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.