**Date:** **NVLAP Lab Code:** Click or tap here to enter text.

**NIST HANDBOOK 150-1 CHECKLIST (ISO/IEC 17025:2017)**

**(Program Energy Efficient Lighting)**

**Instructions to the Assessor:** This checklist addresses specific accreditation criteria prescribed in NIST Handbook 150-1, Energy Efficient Lighting. Included also are instructions and comments sheets used for observing actual demonstrations of the performance of selected test methods. These criteria do not supersede the *Criteria for Accreditation* based on ISO/IEC 17025:2017, which are addressed in the NVLAP General Criteria Checklist.

Place an "X" beside each checklist item that represents a nonconformity. Place a "C" beside each item on which you are commenting for other reasons. Record the nonconformity explanation and/or comment in assessment report created in the assessor portal under the laboratory’s assessment record. Place "OK" beside all other items you observed or verified as compliant at the laboratory.

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| **Requirement** | **Compliance****(OK, X, or C)** | **Management System Reference** | **Objective Evidence** |

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| **3** | **Accreditation process** |

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|  | **3.3** | **Onsite assessment** |  |  |  |
|  | **3.3.3** |  |  |  |  |
|  | **a)** | All laboratory equipment required to perform accredited testing shall be available for assessment and in good working order. | Choose an item. |       |       |
|  | **b)** | Although all test methods need not be set up during the on-site assessment, the laboratory shall be prepared to demonstrate selected test methods as requested by the assessor. | Choose an item. |       |       |
|  | **c)** | For those cases where a demonstration is not requested, the laboratory shall be prepared to describe the test method and procedures it would follow and show the actual equipment, fixtures and arrangements that would be used. | Choose an item. |       |       |
|  | **3.4** | **Proficiency testing** |  |  |  |
|  | **3.4.2** | Laboratories applying for initial accreditation for solid state test methods shall participate satisfactorily in bilateral proficiency testing with NIST. | Choose an item. |       |       |
|  | **3.4.5** | Laboratories renewing accreditation shall have satisfactorily participated in all required proficiency testing during their previous accreditation period. | Choose an item. |       |       |
|  | **3.4.6** | The proficiency testing shall not be contracted to another laboratory. | Choose an item. |       |       |
|  | **3.4.7** | In no case shall proficiency test samples be considered as calibration standards or standard reference materials or be used as substitutes for calibration standards that are traceable to NIST or other national metrology institutes (NMIs). | Choose an item. |       |       |
|  | **3.4.8** | All proficiency test samples, like all other samples received by the laboratory, shall be listed or entered into the normal sample tracking and identification system for control and data recording. | Choose an item. |       |       |
|  | **3.4.9** |  |  |  |  |
|  | **a)** | Using the test data from proficiency testing, the laboratory shall monitor its own testing performance. | Choose an item. |       |       |
|  | **b)** | Procedures for analyzing and monitoring the laboratory’s own test results shall be documented in its management system. | Choose an item. |       |       |
|  | **3.4.10** |  |  |  |  |
|  | **a)** | Unsatisfactory performance in proficiency testing (e.g., outlying results) as determined by NVLAP is a technical nonconformity that shall be resolved by the laboratory through its corrective action process to maintain its accreditation for the test method(s) in question. | Choose an item. |       |       |
|  | **b)** | If the laboratory performs unsatisfactorily in any proficiency test, it shall take corrective action to investigate and resolve nonconformities in a timely manner, according to the requirements in 4.9 of NIST Handbook 150 for the control of nonconforming work. | Choose an item. |       |       |
|  | **3.4.11** |  |  |  |  |
|  | **a)** | The results of proficiency testing shall be made available to NVLAP assessors for review during laboratory on-site assessment visits. | Choose an item. |       |       |
|  | **b)** | Any problems indicated by proficiency testing shall be discussed with appropriate laboratory personnel responsible for developing and implementing plans for resolving the problems. | Choose an item. |       |       |

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| **6** | **Resource requirements** |

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|  | **6.2** | **Personnel** |  |  |  |
|  | **6.2.1** | **Personnel records** |  |  |  |
|  | **6.2.1.1** | ***Key NVLAP accreditation personnel*** — The laboratory shall maintain a document of personnel designated to fulfill NVLAP requirements including: laboratory manager, technical manager, NVLAP authorized representative, NVLAP approved signatories, and staff responsible for conducting testing. | Choose an item. |       |       |
|  | **6.2.1.2** | ***All testing laboratory staff*** — The laboratory shall document and maintain records of each staff member, including a résumé of qualifications, laboratory testing procedures to which the person is assigned and authorized to perform, and the results of periodic testing performance (competency) reviews (see also 6.2.3.4). | Choose an item. |       |       |
|  | **6.2.1.3** | ***Notification of changes*** — The laboratory shall notify NVLAP within 30 days of a change in the NVLAP authorized representative or approved signatories. | Choose an item. |       |       |
|  | **6.2.2** | **Specific experience and competence of technical manager**The laboratory’s technical manager shall have a combination of knowledge, experience, and training in testing energy efficient lighting products defined on the (proposed) scope of accreditation and shall have technical competence and supervisory capability to direct the work of professionals and technicians in testing energy efficient lighting products. | Choose an item. |       |       |
|  | **6.2.3** | **Competency review** |  |  |  |
|  | **6.2.3.1** | The laboratory shall develop an appropriate list of staff member competencies for each test method. Competencies may include specimen preparation and/or mounting techniques; techniques for measuring ambient thermal conditions; lamp seasoning and stabilization procedures; procedures for transporting lamps between warm-up racks and measurement apparatus; voltage, current, and electrical power measurements; oscilloscope measurements; ballast circuit connection and verification; photometric calibration techniques; thermocouple mounting and calibration; colorimetric measurement techniques; and goniophotometric measurement techniques, among many possible techniques. | Choose an item. |       |       |
|  | **6.2.3.2** | The laboratory shall evaluate the competency of each staff member for each test method or part of a test method the staff member is authorized to conduct. | Choose an item. |       |       |
|  | **6.2.3.3** | For each staff member, the staff member’s immediate supervisor or designee shall conduct annually an assessment of performance competence. | Choose an item. |       |       |
|  | **6.2.3.4** | These annual performance competency reviews shall be documented, dated, signed by the supervisor and employee, retained in the personnel files, and be available for review by the assessor. | Choose an item. |       |       |
|  | **6.2.4** | **Training** |  |  |  |
|  | **a)** | A training program shall be maintained and documented. | Choose an item. |       |       |
|  | **b)** | Authorized staff members shall be given additional training when accredited test methods are updated or procedures change, or when the individuals are assigned new responsibilities.***NOTE*** *Each staff member may receive training for assigned duties either through on-the-job training, formal classroom study, attendance at conferences, or other appropriate mechanisms.* | Choose an item. |       |       |
|  | **6.4** | **Equipment** |  |  |  |
|  | **6.4.1** |  |  |  |  |
|  | **a)** | Proper performance and calibration of measurement and test equipment shall be periodically verified as needed through the use of cross-checks and/or working standards. | Choose an item. |       |       |
|  | **b)** | The periodic verification shall be recorded. | Choose an item. |       |       |
|  | **6.4.2** | The laboratory shall maintain a record of usage, in hours, of standard (or reference) lamps. | Choose an item. |       |       |
|  | **6.4.3** | Standard (or reference) lamps shall be recalibrated at appropriate intervals determined by the laboratory.***NOTE*** *Typical reference lamps decrease in luminous intensity by 0.6 % every 24 hours of burning time when operated at a current that produces a correlated color temperature of 2856 K. An acceptable calibration interval for a standard reference lamp would be 30 hours to 50 hours of burning time.* | Choose an item. |       |       |
|  | **6.4.4** | The reference standards used and the environmental conditions at the time of calibration shall be recorded for all calibrations. | Choose an item. |       |       |
|  | **6.4.5** | The following requirements apply for calibrations and calibration certificates: |  |  |       |
|  | **a)** | Certificates shall be required for calibrations performed by outside services. | Choose an item. |       |       |
|  |  | A calibration certificate shall indicate measurement uncertainty or accuracy tolerance limits. | Choose an item. |       |       |
|  | **b)** | Records shall be required when a laboratory performs its own calibration including the identity of the properly trained personnel involved, the standard metrological procedures used, the environmental conditions, and the measurement uncertainty. | Choose an item. |       |       |
|  |  | Evidence and demonstration of traceability as required in NIST Handbook 150, Annex B, shall be documented. | Choose an item. |       |       |
|  |  | Records shall contain sufficient information to permit repetition of the calibration (see appendix A). | Choose an item. |       |       |
|  | **c)** | Laboratories using standard (or reference) lamps and/or standard photometers shall document the traceability chain and, for each step, the magnitude of the associated measurement uncertainty. | Choose an item. |       |       |
|  | **6.4.6** | The laboratory shall conduct a test after every calibration to assure and validate that the calibration of the system is acceptable.***NOTE*** *One way to verify calibration is to measure a check lamp. Measured values of the check lamp should be within predefined limits, e.g., <1 % for lumen output.* | Choose an item. |       |       |
|  | **6.4.7** | The laboratory shall have a documented method, including frequency or schedule, to assure that the check lamps used to verify calibration results are valid; i.e., the measured values have not changed but are within a given limit of repeatability.***NOTE*** *One way to assure the required reproducibility of the check lamp is to use three lamps to check calibration results. Measured values of all three lamps shall be within a predetermined limit of their previous values.* | Choose an item. |       |       |
|  | **6.5** | **Metrological traceability** |  |  |  |
|  |  | The laboratory shall determine equipment calibration intervals based on the equipment’s frequency of use and the environment in which it is used, and also in accordance with standard test methods and/or manufacturer’s recommendations. | Choose an item. |       |       |

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| **7** | **Process requirements** |

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|  | **7.2** | **Selection, verification and validation of methods** |  |  |  |
|  | **7.2.1** | The laboratory shall have readily available, in either electronic or paper format, all technical standards for which accreditation is being requested. | Choose an item. |       |       |
|  | **7.2.2** | When a technical standard contains normative references, the laboratory shall have the referenced documents readily available where necessary for proper implementation of the standard. | Choose an item. |       |       |
|  | **7.2.3** | The management system documentation shall contain or make reference to detailed written documentation of the procedures, practices, instructions, and equipment that the laboratory uses in conducting the test methods for the different types of lamps, luminaires, solid state lighting products or LED devices for which it seeks or holds accreditation. These detailed instructions, including those for equipment operation, calibration checks, quality control checks, and operation of particular type(s) of devices tested shall address any laboratory-specific information not contained in the standard method and shall be supplemented with additional detailed instructions beyond the test method to ensure consistent application. Simply referencing the IES LM or ANSI standard is not acceptable. | Choose an item. |       |       |
|  | **7.2.4** | The management system documentation shall contain or make reference to detailed written documentation of the procedures, practices, instructions, and equipment that the laboratory uses in conducting the test methods for the different types of lamps, luminaires, solid state lighting products or LED devices for which it seeks or holds accreditation. These detailed instructions, including those for equipment operation, calibration checks, quality control checks, and operation of particular type(s) of devices tested shall address any laboratory-specific information not contained in the standard method and shall be supplemented with additional detailed instructions beyond the test method to ensure consistent application. Simply referencing the IES LM or ANSI standard is not acceptable. | Choose an item. |       |       |
|  | **7.3** | **Sampling** |  |  |  |
|  |  | All requirements of ISO/IEC 17025 for sampling apply to subsampling. When a laboratory tests some subset of the test items supplied by the customer, it is subsampling. | Choose an item. |       |       |
|  | **7.6** | **Evaluation of measurement uncertainty** |  |  |  |
|  | **a)** | The management system documentation shall list the important components that substantially affect the measurement uncertainty of the test results for each test method on the (proposed) scope of accreditation. This can be done for groups of similar test methods (e.g., grouped by electrical, photometric [intensity, flux], colorimetric, life-performance properties, or lumen maintenance) rather than for each test method. | Choose an item. |       |       |
|  | **b)** | Further, an estimate of the magnitude of identified uncertainty contributions shall be provided. The uncertainty shall be calculated and reported if required by the test method, the regulator, or the customer.***NOTE*** *The uncertainty contribution of the important components only need be approximated. At this time, documentation validating the uncertainty contribution is not required.* | Choose an item. |       |       |
|  | **7.7** | **Ensuring the validity of results** |  |  |  |
|  |  | Procedures for the laboratory’s participation in NVLAP proficiency testing, including analyzing and monitoring the laboratory’s results, a description of any corrective actions taken because of the results, and procedures for comparing the laboratory’s proficiency test results with those from NIST or other NVLAP-accredited laboratories shall be documented. | Choose an item. |       |       |
|  | **7.8** | **Reporting of results** |  |  |  |
|  | **7.8.1** | Test reports shall clearly reference the test method and edition, including the published year, used for testing. | Choose an item. |       |       |
|  | **7.8.2** | The laboratory personnel responsible for report writing and generation shall be available to be interviewed by the assessor during the laboratory’s on-site assessment. | Choose an item. |       |       |

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| **8** | **Management system requirements** |

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|  | **8.2** | **Management system documentation** |  |  |  |
|  |  | The laboratory shall create a cross-reference document that facilitates verification by both the laboratory and the NVLAP assessor that all program requirements have been addressed by the management system if the management system does not follow the outline of ISO/IEC 17025. This review includes clauses 4 through 8 of ISO/IEC 17025 and annexes A, B, and E of NIST Handbook 150 and the corresponding NIST Handbook 150-1. | Choose an item. |       |       |
|  | **8.4** | **Control of records** |  |  |  |
|  |  | Records shall be kept for a period of at least three years unless a longer period is required by the customer, regulation, or the laboratory’s own procedures. | Choose an item. |       |       |
|  | **8.8** | **Internal audits** |  |  |  |
|  | **8.8.1** | The internal audit shall cover compliance with NVLAP, laboratory management system, contractual, testing, and test method requirements, and shall be completed at an interval no greater than two years. A NVLAP onsite assessment does not take the place of an internal audit. | Choose an item. |       |       |
|  | **8.8.2** | An applicant laboratory shall conduct at least one complete internal audit, including the test methods on the laboratory’s proposed scope of accreditation, prior to the first onsite assessment. | Choose an item. |       |       |
|  | **8.9** | **Management reviews** |  |  |  |
|  | **8.9.1** | Periodic reviews of the management system shall reflect adherence to NVLAP requirements and the laboratory’s quality objectives and shall be completed, at a minimum, on an annual basis. | Choose an item. |       |       |
|  | **8.9.2** | An applicant laboratory shall perform at least one complete management review prior to the first onsite assessment. | Choose an item. |       |       |
|  | **8.9.3** | For accredited laboratories, reports and pertinent records for management reviews conducted since the previous on-site assessment shall be made available for review during the onsite assessment. | Choose an item. |       |       |