LIA LABORATORIES REGISTERED PHOTOMETRIC LABORATORIES SCHEME

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SPHERE PHOTOMETRY

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LIA LABORATORIES SCHEME FOR THE REGISTRATION OF PHOTOMETRIC LABORATORIES

1. OBJECT

The main object of the Scheme is to provide an assurance of the validity of the photometric data published by manufacturers when describing the performance of their lighting products. A manufacturer participating in this Scheme will be required to undergo a thorough inspection of their Laboratory(ies) in order to verify the adequacy of the photometric equipment, documentation and the technical competence of the staff. A manufacturer who meets the requirements will be permitted to describe their Laboratory(ies) as a 'LIA Laboratories Registered Photometric Laboratory' and this legend, together with an explanation of its meaning, may be published alongside relevant photometric data. LIA Laboratories will ensure, by regular inspection, that the quality of the measurements made by a 'Registered Laboratory' is maintained at an appropriately high standard. An up-to-date list of 'Registered Laboratories' will be held by the LIA Laboratories and will be available on request.

Details of the Scheme are given in the following sections:

2. SCOPE

(a) The Scheme is not one for the approval of a product. It is confined to Laboratory capabilities and in no way will be concerned with the factory production.

(b) The verification of the photometric capability of the Laboratory will apply to the testing of all the normal types of lighting products tested within a sphere. The products may include those used in exterior situations. The competence of the Laboratory to test special purpose products will be considered upon request.

(c) The sole purpose of the Scheme is that under a formal agreement, a manufacturer may be given permission to include an agreed form of wording in association with technical data in catalogues, in tender documents or to purchasers of equipment. Such wording will indicate (as far as is practical in a short phrase) that the LIA Laboratories is satisfied, by its own regular inspection and testing, that the manufacturer is equipped and capable of producing accurate and meaningful photometric data. It is not intended to be a form of certification of individual pieces of data which are the responsibility of the manufacturer nor is it intended to give a manufacturer accreditation to carry out testing and supply reports to ISO/IEC 17025.

(d) The Scheme will be available to all lighting equipment manufacturers, but only in regard to the use of their photometric sphere testing capabilities for the products produced by the owner of the 'Registered Laboratory'.

(e) Subcontracting of photometric measurements for the purpose of this scheme is not permitted.

3. OPERATION OF SCHEME

(a) On receipt of an application form from a manufacturer, the scope of the 'Registration' will be established in terms of the ranges and types of products for which registration of test facilities is required. On the basis of this information, the manufacturer's Laboratory will be visited and examined in detail in respect of equipment, instruments, operating staff, methods of documentation etc. A number of light sources (2 minimum; 1 X incandescent and 1 X LED) will be brought with the auditor to witness testing carried out by the manufacturer at this time. The data obtained will be made freely available to the LIA Laboratories for comparison purposes. On the basis that the manufacturer's Laboratory is satisfactory and that the manufacturer's test data on the products tested is verified by LIA Laboratories, formal permission will be given to the manufacturer to use the agreed form of wording on their published data sheets, see 'Permitted Form of Wording', conditional to them accepting the continuing surveillance requirements.

(b) During the validity of the agreement, LIA Laboratories will make a maximum of two routine visits per annum (in normal circumstances) and reserve the right to make unannounced visits to the 'Registered Laboratory' for the purpose of verifying that the Laboratory and its staff are unchanged since the initial inspection. At the time of such visits, LIA Laboratories will have the right to select products for re-testing at its facilities up to a maximum of two products per year.

Where the manufacturer's Laboratory is found not to be maintaining the required standard of competence, additional visits and testing may be necessary and will involve extra charge to the manufacturer concerned.

If the manufacturer's Laboratory is found to be unable to maintain the required standard of competence, the Laboratory will be removed from the register and permission to use the agreed form of wording in their published data will be withdrawn.

(c) The LIA Laboratories has drawn up objective levels for the apparatus, staffing and competence considered necessary for the commercial photometry of general purpose lighting products. The criteria thus arrived at shall be the basis of the 'Registration' of a Laboratory but it is emphasised that the ultimate authority for the operation of the Scheme shall belong to LIA Laboratories.

(d) A manufacturer entering the Scheme is required to send to the LIA Laboratories a copy of every publication they issues which contains photometric data covered by the Scheme.

(e) All matters connected with the 'Registration' of an individual manufacturer's Laboratory(ies) remain confidential between that manufacturer and LIA Laboratories.

4. SCHEME REQUIREMENTS

4.1. QUALITY MANAGEMENT SYSTEM (QMS) REQUIREMENTS

4.1.1. Quality management system

The scheme member shall establish, implement and maintain a management system appropriate to the scope of its activities. The management system policies related to quality, including a quality policy statement, shall be defined in a quality manual (however named). The overall objectives shall be established, and shall be reviewed during management review. The quality policy statement shall be issued under the authority of top management.

The quality manual shall include or make reference to the supporting procedures including technical procedures. It shall outline the structure of the documentation used in the management system.

4.1.2. Company representative

A nominated member of the management team shall be responsible for the QMS.

4.1.3. Document control

The scheme member shall establish and maintain procedures to control all documents that form part of its management system (internally generated or from external sources), such as regulations, standards, other normative documents, test and/or calibration methods, as well as drawings, software, specifications, instructions and manuals.

The scheme member shall document its policies, systems, programs, procedures and instructions to the extent necessary to assure the quality of the test results. The system's documentation shall be communicated to, understood by, available to, and implemented by the appropriate personnel.

All documents issued to personnel in the laboratory as part of the management system shall be reviewed and approved for use by authorised personnel prior to issue. A master list or an equivalent document control procedure identifying the current revision status and distribution of documents in the management system shall be established and shall be readily available to preclude the use of invalid and/or obsolete documents.

All documentation shall be uniquely identified, such identification shall include the date of issue and/or revision identification, page numbering, the total number of pages or a mark to signify the end of the document, and the issuing authority(ies).

4.1.4. Review of requests and acceptance

Scheme members are required to maintain a record of each testing request, request review and acceptance for all test work carried out. They shall ensure the requirements, including the methods to be used, are adequately defined, documented and understood before commencing testing.

Such records must provide a cross reference to a unique job number and corresponding report reference.

4.1.5. Purchasing

Purchase orders shall detail that components and materials must comply with the appropriate standard. Evidence of compliance shall be requested from the supplier. Evidence should take the form of certification and/or testing.

4.1.6. Goods inward inspection

The company shall check that incoming materials conform to the purchase order. They shall also check that the ordered material has the requested evidence of compliance. Equipment and materials shall be segregated from use until these checks have been completed and compliance verified.

4.1.7. Complaints

The company shall maintain a register of all complaints received on the quality of their test work, which should show the steps they have taken to deal with the problem and their analysis of the causes. These records shall be kept for a minimum of 10 years.

4.1.8. Procedures for non-conformances

Where equipment and/or testing control/target values are out of specification there must be a procedure for identifying and correcting these deficiencies. The QMS should be adequate enough to be able to detect non conformances quickly enough so that effected data/reports can be quarantined.

4.1.9. Improvement

The company shall continually improve the effectiveness of its management system through the use of the quality policy, quality objectives, audit results, analysis of data, corrective and preventive actions and management review.

4.1.10. Records

Scheme members shall ensure that a suitable control process is in place and all records are legible and shall be stored and retained in such a way that they are readily retrievable and kept in a format that is acceptable to LIA Laboratories for a minimum of 10 years.

All records shall be held secure and in confidence without risk of accidental or intentional unauthorised change. The scheme member shall have procedures to protect and back-up records stored electronically and to prevent unauthorised access to or amendment of these records.

The laboratory shall retain technical records of original test observations, derived data and sufficient information to establish an audit trail, calibration records, staff records and a copy of each test report issued. The records for each test shall contain sufficient information to facilitate, if possible, identification of factors affecting the uncertainty and to enable the test or calibration to be repeated under conditions as close as possible to the original. The records shall include the identity of personnel responsible for the sampling, performance of each test and checking of results. Observations, data and calculations shall be recorded at the time they are made and shall be identifiable to the specific task.

When mistakes occur in technical records, each mistake shall be crossed out, not erased, made illegible or deleted, and the correct value entered alongside. All such alterations to records shall be signed or initialed by the person making the correction. In the case of records stored electronically, equivalent measures shall be taken to avoid loss or change of original data.

The following records shall be maintained.

- Purchase requisitions
- Goods inwards inspection details
- Inspection/test records
- Copies of documents of conformity from manufacturers/suppliers
- In-house calibration records
- Copies of external calibration certificates
- Operator training
- Corrective and preventative action meeting records
- Audit records
- Records of any procedure changes
- Customer complaints
- Records of management review meetings

4.1.11. Internal audits

The scheme member shall periodically, and in accordance with a predetermined schedule and procedure, conduct internal audits of its activities to verify that its operations continue to comply with the requirements of the management system and this scheme.

A schedule of audit activities and key areas shall be established and ongoing assessment of capabilities carried out, the outcome of all internal audits should then be fed back into corrective and preventative actions as well as management reviews.

4.1.12. Management responsibility

Management shall clearly define the responsibility, authority and interrelationships of all personnel who manage, perform or verify work affecting the quality of the testing. Management shall ensure that its personnel are aware of the relevance and importance of their activities and how they contribute to the achievement of the objectives.

The management of the company shall carry out a regular review of the system (at least once per annum), which shall include all audit and corrective & preventative action records and any complaints that have been received. Records shall be kept of any topics discussed and decisions made.

Top management shall ensure that appropriate communication processes are established within the laboratory and that communication takes place regarding the effectiveness of the QMS.

4.1.13. Personnel and training

Management shall formulate the goals with respect to the education, training and skills of the laboratory personnel. The scheme member shall have a policy and procedures for identifying training needs and providing training to its personnel.

The scheme member shall establish appropriate training plans and maintain records to show that staff have been satisfactorily trained to undertake the testing activities that they have been assigned. Records must be kept of this training and the effectiveness of the training actions taken shall be evaluated.

The scheme member shall maintain current job descriptions for managerial, technical and key support personnel involved in testing.

4.1.14. Test procedures

Testing procedures and pass/fail criteria shall be available to all personnel involved in testing, these procedures shall be written to take account of the requirements of any currently available harmonized standards and/or guidance documents appropriate to the type of testing.

All testing procedures shall be established, reviewed and controlled in line with the requirements of 4.1.3 above.

The scheme member shall have and shall apply procedures for estimating uncertainty of measurement.

4.1.15. Test equipment

All equipment used to conduct tests shall be appropriate to its intended use, properly maintained and calibrated. The equipment required shall be established based on the requirements of appropriate current harmonized standards and relevant CIE publications for the type of products the scheme member is intending to measure.

Calibration of test equipment shall be carried out when the equipment is suspected of malfunction, or subject to physical or environmental abuse. In any case calibration must be conducted at least once per year.

Records shall be kept of calibration and shall include:

- Reference number and identification
- Date of calibration
- Date of next calibration due
- Traceability of reference standards
- Name or reference of person carrying out the calibration
- Statement of calibration compliance/non-compliance

The current calibration status of test equipment used must be clearly visible to the operator. Use of test equipment outside calibration validity is not permitted.

4.1.16. Traceability

As part of the QMS, scheme members will need to implement procedures, which enable appropriate traceability of all testing work carried out.
The procedures shall include but is not limited to the identification of all equipment used, test standard(s), personnel, operating conditions environmental conditions.

4.1.17. Equipment maintenance and calibration

The scheme member shall establish an equipment register and all equipment being used shall be uniquely identifiable. Whenever practicable, all equipment requiring calibration shall be labelled, coded or otherwise identified to indicate the status of calibration, including the date when last calibrated and the date when recalibration is due.

All equipment used for tests and/or calibrations, including equipment for subsidiary measurements (e.g. for environmental conditions) having a significant effect on the accuracy or validity of the result of the test, calibration or sampling shall be calibrated before being put into service. The scheme member shall have an established programme and procedure for the calibration of its equipment including procedures for the safe handling, transport, storage, use and planned maintenance of measuring

equipment to ensure proper functioning in order to prevent contamination or deterioration. A record of the maintenance and calibration carried out shall be kept.

The scheme member shall establish calibration acceptance criteria for all critical equipment and ensure that a check is performed against said criteria before putting the equipment into service after calibration.

If the calibration is carried out 'in-house' then the references shall be calibrated at an acceptable period against national or international standards by a third party.

Equipment shall be operated by authorised personnel only. Up-to-date instructions on the use and maintenance of equipment (including any relevant manuals provided by the manufacturer of the equipment) shall be readily available for use by the appropriate laboratory personnel.

Where equipment has been subjected to overloading or mishandling, gives suspect results, or has been shown to be defective or outside specified limits, it shall be taken out of service. It shall be isolated to prevent its use or clearly labelled or marked as being out of service until it has been repaired and shown by calibration or test to perform correctly. The scheme member shall examine the effect of the defect or departure from specified limits on previous tests and shall implement the "Procedures for non-conformances" (see 4.1.8 above).

4.1.18. Independence and impartiality

The laboratory should be able to demonstrate that it is impartial and that it and its personnel are free from any undue commercial, financial and other pressures which might influence their technical judgement. The laboratory should not engage in any activities that may endanger the trust in its independence of judgement and integrity in relation to its testing activities.

The responsibilities of key personnel in the organisation that have an involvement or influence on the testing activities of the laboratory shall be defined in order to identify potential conflicts of interest. The organisational arrangements should be such that departments having conflicting interests, such as production, commercial marketing or financing do not adversely influence the laboratory's compliance with the requirements of this scheme.

4.1.19. Comparison testing

The results obtained from the comparison testing of the samples supplied in 3 (a) above shall meet within ±10% of the LIA laboratories' reference measurements, where measurements made by the scheme member fall outside this limit LIA Laboratories will consider these on a case by case basis.

The final decision to accept a manufacturer into the scheme shall remain with LIA Laboratories.

5. COSTS

The complete costs for the operation of this scheme will be borne by the individual manufacturers.

(a) Pre-agreement costs will consist of the pre-agreement visit with the associated preparation and report writing and the cost of testing not more than three products.

(b) The re-inspection of 'Registered' Laboratories will require senior personnel making visits at intervals of approximately 12 months.

If a particular manufacturer does not meet the approval requirements, extra tests and visits may be necessary which will involve an extra charge.

6. PERMITTED FORM OF WORDING

In catalogues which contain photometric data in tender form and in separate technical data sheets the wording shall follow the principles described below:

(a) In a prominent place in catalogues or data publication there shall be the following brief description :

LIA Laboratories Register of Photometric Laboratories

LIA Lab operates a scheme which ensures the technical competence of commercial photometric laboratories. Laboratories which are found to meet the requirements for equipment, staff competence and measuring techniques and who agree to continued surveillance in this respect are included in the LIA Laboratories Register of Photometric Laboratories and are permitted to use the words 'LIA LAB REGISTERED PHOTOMETRIC LABORATORY FOR SPHERE MEASUREMENTS' on their published photometric data sheets alongside appropriate measurements. The scheme covers photometric information derived from data, such as light output. It does not include non-photometric matters connected with electrical and mechanical safety, nor does it include suitability for Flameproof, Division 2 and similar uses which require separate approvals by other authorities.

(b) Each relevant separate data sheet shall include the name of the Laboratory and the phrase 'LIA LAB REGISTERED PHOTOMETRIC LABORATORY FOR SPHERE MEASUREMENTS' see '.....'. This is a reference to the page in the publication containing the description of the Scheme as given in 'Permitted Form of Wording'.

(c) The permitted phrase 'LIA LAB REGISTERED PHOTOMETRIC LABORATORY FOR SPHERE MEASUREMENTS' on a data sheet applies only to photometric data covered by the scheme. It must not be used in a misleading manner, for example, where the approval of other authorities is involved such as Flameproof or Division 2 use, these separate approvals must be clearly stated.

7. CERTIFICATION PERIOD

7.1. CERTIFICATION DURATION AND REASSESSMENT INTERVALS

Following a successful conformity assessment a certificate will be issued. The certification period will run for three (3) years from the date of issue, assuming that on-going assessment confirms that the products and/or systems remain in conformity with the scheme. Prior to the end of the three year period, a review shall be undertaken to determine whether it is appropriate to reissue the certificate and commence a new certification cycle of three years. The purpose of the review is to assess whether:

- Any of the conformity standards, supporting standards or scheme requirements have been updated since the initial assessment.
- Regulatory requirements, appropriate to the product and/or systems have changed.
- The product/service range falling under the scope of certification needs to be increased / decreased.
- The products/services themselves have undergone any significant changes in design, or composition.
- There have been significant changes to production location or facilities.
- There have been any significant changes to factory production control methods or manufacturing processes.

The impact of any such changes on the QMS, validity of the initial assessment and certification decision shall be assessed.

Where no significant changes are identified, and on-going conformity is assured, then the certificate will be reissued for a further three years, subject to the ongoing scheme requirements.

Where significant changes which affect the validity and scope of the certification are identified, actions necessary to address these changes will be communicated to the client. The certificate may be suspended, or withdrawn until the issues have been addressed satisfactorily. When actions have been completed satisfactorily to bring the certification up to date, then the certification period will recommence for a further three years.

7.2. CHANGES DURING CERTIFICATION

In addition to the re-certification review, it is the responsibility of the client to inform LIA Laboratories of any changes that occur affecting certification as identified in 7.1 within the certification period. The impact of any such changes on the QMS, validity of the initial assessment and hence certification decision shall be assessed.

Where no significant changes are identified, and on-going conformity is assured, then the certificate will remain valid, subject to the ongoing scheme requirements.

Where significant changes are identified, which affect the validity and scope of the certification, and then actions necessary to address these changes will be communicated to the client. The certificate may be suspended, or withdrawn until the issues have been addressed satisfactorily.

8. AUDIT ASSESSMENT

The scheme member shall allow access to premises and participate in audits of the FPC-QMS conducted by LIA Laboratories. Audits may be carried out unannounced.

Surveillance audits will usually be carried out once per year following an initial inspection. It may however be necessary to increase the number of visits following an unsatisfactory outcome of a scheduled assessment.
The scheme member will be provided with an audit report which details any corrective actions required by the member. Such corrective actions must be completed and confirmed in writing to LIA Laboratories within the following timescales on receipt of the report.

Initial Assessment Audit		**Surveillance Audit**	
Major Non-conformity	Minor Non-conformity	Major Non-conformity	Minor Non-conformity
3 months	3 months	1 month	2 months

Verification of the corrective action will normally be carried out during the next surveillance visit. It may, however, be necessary to carry out an unscheduled visit under certain circumstances.

9. THE LIA LABORATORIES REGISTER

A list of 'Registered Photometric Laboratories' is kept at the LIA Lab situated at Stafford Park 7, Telford, Shropshire. TF3 3BQ. (Tel) +44 (0) 1952 290907 or e-mail at lab@thelia.org.uk from which users can obtain up-to-date information.

10. PHOTOMETRIC DATA OF MANUFACTURER'S WITHOUT A LABORATORY

Where a manufacturer without laboratory facilities wishes to authenticate technical data published on their products, they can have the measurements made at the LIA Laboratories. They may then state on their literature "based on LIA Laboratories Report No .....".

It is expected that, as the user learns to appreciate the value of authentication for published data, manufacturers without their own facilities will increasingly use the LIA Laboratories for this purpose.

11. LIA LABORATORIES USE OF DATA

Where the laboratory obtains data from the measurement of “known” light sources it reserves the right to use this data, this may be in the form of comparison tables between equipment or manufacturers. In all cases any data used will be anonymous and individual organisations will remain unidentified.

12. ACCESS TO FACILITIES AND INFORMATION

Where a complaint is received by the LIA Laboratories regarding a product and/or data covered by the scheme, the manufacturer will make available to the LIA Laboratories any information, data, samples and access to facilities, personnel and subcontractors in order to investigate such complaints.

On occasion, where a scheme is covered within the LIA Laboratories’ ISO 17065 schedule of accreditation with UKAS, there may be a need to allow third party access to a manufactures’ facilities during the assessment process. It should be noted that the manufacturer will be notified of any such requirement, all information obtained during such visits will remain confidential at all times.

13. IMPARTIALITY

The latest copy of the LIA Laboratories’ impartiality policy along with the Terms & Conditions of this scheme can be found on www.lialabcert.org.uk alternatively a copy can be requested by e-mail at lab@thelia.org.uk.

14. APPLICATION

An application form for this scheme can be downloaded from www.lialabcert.org.uk alternatively a copy can be requested by e-mail at lab@thelia.org.uk.

15. ADDITIONAL INFORMATION

Details of the evaluation procedures, rules and procedures for granting, for maintaining, for extending or reducing the scope of, for suspending and for withdrawing certification can be requested by email at lab@thelia.org.uk.

ANNEX 1 – NORMATIVE STANDARDS

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS EN ISO 9001	Quality management systems. Requirements
BS EN ISO/IEC 17025	General requirements for the competence of testing and calibration laboratories
BS EN ISO/IEC 17065	Conformity assessment - Requirements for bodies certifying products, processes and services
BS EN 13032-1	Light and lighting. Measurement and presentation of photometric data of lamps and luminaires Part 1: Measurement and file format
CIE 84	The measurement of luminous flux
CIE 121	The photometry and goniophotometry of luminaires