

## APLAC T088

### APLAC Proficiency Testing Program

#### Photometric measurement of Solid State Lighting Products

#### 1. Objective

This program is intent to make an investigation on the measurement capacity of the laboratories in different countries and regions, understand the difference between the different laboratories, help the specific laboratories to make improvement, and try to establish a kind of equivalence. This program also cooperates with IEA 4E SSL Annex so that the results of this program can be linked to *the Interlaboratory Comparison 2013* (IC 2013) [6] run by IEA 4E SSL Annex, whereby the results of this PT program may be recognized internationally.

#### 2. Organization and Responsibilities

This program was organized by China National Accreditation Service for Conformity Assessment (CNAS), with National Lighting Test Centre (NLTC) as the collaborator, under the auspices of Asia Pacific Laboratory Accreditation Cooperation (APLAC).

During this proficiency testing program, CNAS would be responsible for proposing this program for approval by the APLAC Proficiency Testing Committee, inviting participants, circulating the draft report and final report to participants and acting as a contact point among APLAC, participating accreditation bodies / participants and NLTC. NLTC will be responsible for the preparing, packaging, dispatching samples, handling participants' queries, receiving the test results, receiving samples and make confirmation evaluation of the samples, statistical analysis, issuing interim and final report.

#### 3. Points of contacts

The contact details are given below:

Coordinator of organising accreditation body CNAS:

Name: HE Ping

Address: No.8 Nanhuashi str., Dongcheng District, Beijing, 100062, China

E-mail address: hepings@cnas.org.cn

Phone number: +86 10 67105290

Coordinator of the proficiency testing provider in NLTC:

Name: ZHANG Wei

Address: No.A3 Changpocun, Dabeyiao, Choyang District, Beijing, 100022, China

E-mail address: zhangwei@nltc.cn

Phone number: +86 10 67708989 (EXT) 4103

#### 4. Description of Comparison Artefacts

Participating laboratories will be divided into several loops, such as Loop 1, …, Loop x, … . In each loop, five different types of lighting products will be included. The identifier is labeled on each product clearly. The indicator and specifications of the artefacts in each loop are given in Table 1.

**Table 1: Properties of Artefacts Under Test**

Identifier	Lamp Type	Rated Voltage	Rated Power	Nominal CCT	Other Conditions
NLTC-A	Incandescent lamp	220 V AC	60W	2700 K	AC frequency: <u>50</u> Hz
NLTC-B	Omnidirectional LED lamp	220 V AC	5 W	2700 K	
NLTC-C	Directional LED lamp	220 V AC	8 W	3000 K	
NLTC-D	High CCT LED lamp	220 V AC	6 W	5000 K	
NLTC-E	Low power-factor LED lamp	220 V AC	6 W	3000 K	

#### 5. Stability Check

Before shipment of the artefacts, ISO/IEC 13528:2005 will be applied for to check and assure the stability of the artefacts. After the artefacts are returned back to NLTC, parameters will be re-tested by NLTC to assure the stability of the artefacts.

#### 6. Properties Measured for Comparison and requirement

- A. The following properties / quantities will be measured and compared in this proficiency testing. Tests are asked to perform twice, and according to the

Appendix “Measurement Method for the Proficiency Testing Program”. Participants should show all decimal places, with at least four significant digits. Participants should also enter the measurement units where appropriate.

- 1) Total luminous flux (lm)
- 2) RMS Voltage (V) and Current (A)
- 3) Electrical active power (W)
- 4) Luminous efficacy (lm/W)
- 5) Chromaticity coordinates x, y
- 6) Correlated Colour Temperature (K)
- 7) Colour Rendering Index (CRI) Ra
- 8) Power factor (PF)

Uncertainty is required to be calculated and reported by the participating laboratories, and the ISO Guide and CIE 198 should be followed. The total uncertainty of each measured quantity shall be expressed in expanded uncertainty with a confidence interval of 95 % or a coverage factor  $k=2$ . The reported uncertainty should be with at most two significant digits.

## 7. Assign Value

Assigned value  $X$  will be given by NLTC against the “Measurement Method for the Proficiency Testing Program”. The assigned value is the average value that before the artefacts shipment ( $X_1$ ) and after the returning back ( $X_2$ ).

## 8. Evaluation of the Performance and criteria

With ISO 13528 in reference,  $E_n$  value will be applied to evaluate the test results that given by the participants, as following. Criteria are as, the value of  $|E_n| \leq 1.0$  is considered to be satisfactory,  $|E_n| > 1.0$  is considered to be unsatisfactory.

$$E_n = \frac{x - X}{\sqrt{U_{lab}^2 + U_x^2}}$$

Where the  $U_{lab}$  is the expanded uncertainty of the participant’s measurement, and  $U_x$  is the expanded uncertainty of the assigned value. Uncertainty of the assigned value  $u_x$ , is as following.

$$u_x = \sqrt{\frac{u_{X_1}^2 + u_{X_2}^2}{2^2} + \frac{(X_1 - X_2)^2}{(2\sqrt{3})^2}}$$

## 9. Reporting to the Participants

After the artefacts returning back to NLTC, interim report will be prepared and distributed. With the approval of APLAC, final report will be distributed.

## 10. Confidentially

Participants in the reports will only be indicated by the lab code.

## 11. Eligibility of Participants and Fee

Laboratories that have measurement equipment that is capable of conducting measurement are eligible to participate. Each APLAC member accreditation body will have one to two laboratories for free participating.

## 12. Program Schedule

Event	Period	Responsible
Artefacts preparation	Sep - Dec 2012	NLTC
Proposal submission for APLAC PT approval	Dec 2012	CNAS
Invitation of participants	Dec 2012 - May 2013	CNAS
Dispatch of artefacts	Mar - Oct 2013	NLTC
Statistical analysis of results	Nov. 2013	CNAS/NLTC
Interim report	Nov 2013	CNAS/NLTC
Draft final report	Dec 2013	CNAS/NLTC

## 13. Linking results to IEA 4E SSL Annex IC2013

Upon request by the participants who wish to be recognized as participants of IC2013 also, NLTC will perform comparison measurements for their participants in compliance with the *SSL Annex Interlaboratory Comparison Protocol for NLTC* [7] as well as in compliance with this document for APLAC PT program. For those participants, NLTC will also produce test reports as specified by the IC2013 Protocol [7] in addition to test reports for the APLAC PT program.

## 14. Reference

- [1] ISO/IEC 17043:2010, Conformity assessment - General requirements for proficiency testing.
- [2] APLAC PT002-2003, Testing interlaboratory comparisons.

- [3] ISO 13528:2005, Statistical methods for use in proficiency testing by interlaboratory comparisons.
- [4] ISO, Guide to the Expression of Uncertainty in Measurement, 1st Edition, 1993.
- [5] CIE 198:2011: Determination of Measurement Uncertainties in Photometry.
- [6] IEA SSL Annex Interlaboratory Comparison 2013, <http://ssl.iea-4e.org/task-2-ssl-testing/2013-ic>
- [7] IEA SSL Annex Interlaboratory Comparison Protocol for NLTC, contact ZHANG Wei, [zhangwei@nltc.cn](mailto:zhangwei@nltc.cn), to get it.