

# Certified Lighting Efficiency Professional Instructions & Application

The following information is contained in this booklet:

## **Part A: Information for Applicants**

- Objectives
- Eligibility
- Required Body of Knowledge
- Procedures
- The Application & Point Scoring Evaluation
- CLEP EXAMINATION OVERVIEW
- Maintaining Certification
- Lifetime Certification
- Reinstatement
- Fees
- CLEP Designation Usage

## **Part B: CLEP Application**

- Applicant Information Data
- Education
- Professional Registration
- Experience Record
- References
- Lighting Project Summary
- Letter of Reference (Cover page and form)
- Employment Verification (Cover page and form)
- Client Verification (Cover page and form)

## **Part C: Study Guide**

- Study Guide References & Topics
- Sample Exam Review Questions
- Reference Book Order Form

# Part A: Information for Applicants

## CERTIFIED LIGHTING EFFICIENCY PROFESSIONAL (CLEP®)

---

Please read thru the following important information before submitting your **CLEP® Application found in Part B** of this booklet.

### 1. CLEP® OBJECTIVES

- To raise the professional standards of those engaged in lighting efficiency management.
- To improve the practice and quality of lighting efficiency projects by encouraging professionals in a continuing education program of professional development.
- To identify persons with acceptable knowledge of the principles and practices of lighting efficiency/management through completing an examination and fulfilling prescribed standards of performance and conduct.
- To award special recognition to those lighting professionals who have demonstrated a high level of competence and ethical fitness for lighting management.

### 2. ELIGIBILITY

Professionals with the following prerequisite may apply:

- An engineering graduate, and/or P.E., and/or R.A., and/or CEM with at least three years experience in lighting efficiency.
- **OR**
- A four-year degree in business or related degree with at least five years' experience in lighting efficiency.
- **OR**
- A two-year technical degree with eight years experience in lighting efficiency.
- **OR**
- Ten years or more verified experience in lighting efficiency.

In addition, applicants must submit 4 completed lighting projects. Feasibility studies and projects not yet completed are ineligible.

### **3. THE REQUIRED BODY OF KNOWLEDGE**

The effective practice of lighting efficiency requires in-depth knowledge of a wide variety of subjects. For certification purposes, however, the candidate need only demonstrate to the satisfaction of the Certification Board the knowledge and ability to apply the essentials of lighting management.

### **4. PROCEDURES**

The first step in the CLEP application process is to complete the application. The application may be typed or completed by hand. Since certification is based on education, experience and passing the examination, it is important that the applicant understands the eligibility requirements (section two), and has attained the prerequisite to qualify for certification.

There are two ways to meet the application deadline:

- The application must be received six weeks prior to the CLEP exam if the applicant feels confident he/she has the necessary prerequisite for certification.
- Should an applicant have questions about the prerequisite for certification, he/she can have his/her application reviewed by the CLEP Board prior to taking the exam. A completed application (including official college transcripts, employment verification and all references) must be received at least three months prior to desired exam date, and the applicant must request in writing that he/she would like his/her application reviewed by the CLEP Board.

The CLEP Board must have a clear understanding of the applicant's lighting experience. Therefore, it is very important that all applicants give clear, complete details.

NOTE: Please arrange for official college transcripts to be forwarded to AEE. Also, if you are self-employed, or principal owner of a company, three Client Verifications are required in place of employment verification.

Your CLEP Application must be approved by AEE prior to sitting for the exam. You will receive a letter once AEE has approved your application with additional exam information. Once the application is complete and the CLEP exam is passed, all applications are sent to the CLEP Board for final approval. Only after Board approval is certification granted.

### **5. THE APPLICATION**

The CLEP application provides an organized method for documenting professional and educational background, achievements and community service.

The personal data form is divided into the following three parts:

- Division I – Education
- Division II – Professional Registration
- Division III – Experience and Activities

A maximum of 350 points each can be earned in Division I and II and 700 points for Division III. The total maximum score that can be credited on the application form is 1400. The applicant is requested to list on the application form all pertinent information in these categories for evaluation by the CLEP Board.

The two areas of evaluation shall receive points as follows:

- Application Form                      1400 points maximum
- CLEP Examination                      1000 points maximum

To be awarded the CLEP designation, candidates must achieve the minimum total of 1400 points with a minimum of 700 points earned from the CLEP Application and the minimum of 700 points earned from the CLEP examination.

If a candidate has failed to acquire sufficient points recommended for CLEP, the candidate may be re-examined at a subsequent examination period and/or resubmit an update application form. Examination scores will be kept on file by the Certification Director for a period of three years. A score can be resubmitted if the candidate so requests.

It is essential that candidates devote considerable time and effort to completing the application form since judgment by the Certification Board can be based only on the information provided. Inaccurate and/or incomplete data will only be a liability for the applicant. Documentation should be attached to the application to substantiate the information presented.

## 6. THE CLEP EXAMINATION

The applicant must complete a four-hour exam. Live Seminar dates and locations are available on our [website](#). Applicants must register separately to attend the associated live seminar. An Examination Administrator will proctor the examination. This Administrator may be an Association associate, an educator, an approved testing expert or agency, or whomever the Certification Director deems appropriate based on pre-approval. The examination questions are based on the Body of Knowledge. **The exam is Open Book!** Because of the diversity of background and experience of lighting efficiency professionals, the examination has 10 different subject sections, all of which are mandatory. The exam consists of multiple choice questions. You must bring a hand calculator to the exam since the CLEP exam does not allow computers, tablets, or cell phones to be used during the test. Grading is accomplished by members of the Certification Department and the CLEP Board. Candidates are notified of exam results by email within 30 days of the exam date.

### **Remote Testing Information:**

Your application along with exam fee should be approved by AEE prior to sitting for the exam. You will receive a letter once AEE has approved your application. At that time, you may log in to the testing center website to begin the exam scheduling process. Please do not contact the testing center regarding the status of your application. Once the application is complete and exam is passed, all applications are sent to the CLEP Board for final approval. Only after this approval is

certification granted. For more information on Remote Testing Center Procedures and locations, visit [www.aeecenter.org/certification/remotetestinginstructions](http://www.aeecenter.org/certification/remotetestinginstructions)

The written CLEP Examination deals with such subjects as:

- **Codes and Standards**
- **Lighting Evaluation and Economics**
- **Lighting Controls**
- **Lighting System Maintenance**
- **Quantity and Quality of Illumination**
- **Environmental Safety**
- **DSM and Lighting Efficiency**
- **Lighting Fundamentals**
- **Design Basics**
- **Lamps and Ballasts**

While application and exam fees are nonrefundable, a candidate may reschedule taking a live exam at any time for any reason. Candidates taking the exam at a Remote Testing Center, if you need to reschedule your confirmed exam date or location, please contact AEE prior to rescheduling. **A \$50 rescheduling fee payable to AEE will be assessed for each reschedule of your Remote Testing Center exam.**

## **7. MAINTAINING CERTIFICATION**

The continued education of lighting professionals is essential to enable them to cope with rapidly changing conditions. Therefore, to remain certified, a Lighting Efficiency Professional must accumulate ten (10) professional credits every three years and submit a completed recertification form to the Certification Director. Each CLEP reaches recertification date on the fourth January 1st following the date appearing on the certificate attesting to certification.

Professional credits for recertification can be accumulated any time from the date receiving certification to December 31 of the recertification year. For example, Lighting Professionals certified by examination and receiving a certification in 2013, file a record of ten professional points with the certification director by December 31, 2016. These professionals all reach recertification on January 1, 2017.

### Activities for CLEP Credits

- Continued employment in lighting activities:  
3 credits for 3 years
- Membership in a professional engineering society:  
3 credits for 3 years
- Continuing education/professional activities (this includes in-house seminars involving lighting):  
2 credits per CEU, college credits hour or 10 contract hours for seminars
- Awards presented and/or papers published involving lighting:  
2 credits each
- Offices held in a professional engineering society:  
1 credit per year

## 8. RETIRED CERTIFICATION

A CLEP upon retiring and reaching the age of sixty-five is certified for life. No further reporting is necessary except to notify the certification director of meeting the age requirement by sending a copy of driver's license.

## 9. SUSPENSION OF REVOCATION OF CERTIFICATION

If a Lighting Professional does not accumulate the required professional credits, certification shall terminate, unless in the judgment of the Certification Board, extenuating circumstances exist and deficiency can be readily overcome.

Certification may be revoked for failure to abide by the AEE Code of Ethics. The Lighting Professional is offered a hearing by the certification board and notified of the views of the complainant and of the hearing date and location. This notice shall be given in writing at least thirty days in advance of the hearing.

## 10. REINSTATEMENT OF CLEP

Lighting Professionals who do not acquire sufficient CLEP maintenance points to be recertified on recertification date will be notified in writing of suspension from using the CLEP designation and will no longer be listed as a CLEP in any AEE publication until such time that the Lighting Professional:

- Resubmits to the certification process and successfully meets the criteria for certification by personal data information and examination;

OR

- Acquires make-up points at a cumulative total equal to 3 ½ per year for every year since original date of certification.

## 11. CLEP FEES:

### Option A: CLEP Exam held with Live Seminar

#### APPLICATION FEE

A fee of \$300.00 dollars is payable with the filing of the application. *No examination fee refunds are allowed.*

Re-Examination Fee: For each re-examination (held with live seminar), a fee of \$100.00 will be required.

### Option B: CLEP Exam at Remote Testing Center

#### APPLICATION FEE

A fee of \$400.00 dollars is payable with the filing of the application. *No examination fee refunds are allowed.*

Re-Examination Fee (Remote Testing Center Location): For each re-examination, a fee of \$150.00 will be required.

#### RENEWAL FEE

For each three-year renewal, the fee will be \$300.00 / Reinstatement fee is \$350.00

*No refunds allowed.*

## 12. USE OF CLEP DESIGNATION

As a Certified Lighting Efficiency Professional (CLEP®), the Lighting Efficiency Professional may use the designation with his/her name on organization letterheads, business cards, certain internet listings and forms of address.

Certification is for individuals only. The CLEP designation may not be used to imply that an organization, company or firm is certified. AEE does not endorse or recommend any individual CLEP, product or service. Improper usage of CLEP or AEE logo may result in suspension. If you have questions about usage of the CLEP designation, please contact AEE.

### **Sample Correct Usage** (Signature / Business Card):

John A. Smith, P.E., CLEP / Mary Jones, CLEP, CEM

### **Web Usage:**

John A. Smith is an individual member of the Association of Energy Engineers ([AEE](#)) and is a [Certified Lighting Efficiency Professional \(CLEP\)](#)

### **Incorrect Usage:**

ABC Company is Certified by AEE.

### **Correct Usage:**

- ABC Company has many Certified Lighting Efficiency Professional -CLEPs® on its staff.
- ABC Company is looking for a Certified Lighting Efficiency Professional with experience for a position.
- John Smith, President of ABC Company, is an individual member of the Association of Energy Engineers and is a Certified Energy Manager (CEM), Certified Carbon Reduction Professional (CRM) and Certified Lighting Efficiency Professional (CLEP).
- ABC Company is a Corporate Member of the Association of Energy Engineers (AEE) and has five current Certified Lighting Efficiency Professional (CLEP) on staff including.....

John Smith is an individual:



Link to [www.aeecenter.org/certification](http://www.aeecenter.org/certification)

Corporate Member of:



Link to [www.aeecenter.org](http://www.aeecenter.org)



# Part B: CLEP APPLICATION

Exam with Live Seminar Version & Study Guide

**DOCUMENTS MUST BE TYPED OR PRINTED, FILLED OUT COMPLETELY AND MAILED TO THE AEE OFFICE**

(Note: Seminar registration is separate registration from this Certification Application)

**Seminar Type:**  Live  Online  On-demand (On Demand attendees must send a copy of Completion Certificate to [fseskin@aeecenter.org](mailto:fseskin@aeecenter.org) before CLEP application can be processed)

Seminar Name / Date / Location: \_\_\_\_\_

**Exam Type:**  Live  Remote Testing

Exam Date / Location: \_\_\_\_\_

*(Complete Date/Location for live exam only)*

After AEE, verifies and approves your information provided, you will receive additional instructions on the Certification. You will be required to show your id. The following information is to be filled out as completely as possible. Please read the "Information for Applicants" very carefully, and also follow instructions for completing and forwarding forms. It is important that the AEE Certification Board have substantiating data for each criteria indicated in the application.

**NOTE:** APPLICATIONS MUST BE ACCOMPANIED BY THE \$300 (Live) or \$400 (Remote) FILING AND EXAMINATION FEE IN ORDER TO BE CONSIDERED. THIS APPLICATION DOES NOT AUTOMATICALLY REGISTER YOU FOR THE TRAINING SEMINAR. PLEASE COMPLETE A SEPARATE SEMINAR REGISTRATION (Live Training Programs and an Online Seminar Version available: see [www.aeecenter.org/seminars](http://www.aeecenter.org/seminars) for dates and locations.

**Mail application and payment to:**

AEE – CLEP Certification Dept.  
3168 Mercer University Drive  
Atlanta, GA 30341

**OR fax to:** (770-447-4354)

Payment enclosed \$ \_\_\_\_\_ Ck# \_\_\_\_\_  
Credit Card#: \_\_\_\_\_ CVV# \_\_\_\_\_  
Amex \_\_\_\_\_ Visa \_\_\_\_\_ Master Card \_\_\_\_\_ Discover \_\_\_\_\_  
Expiration Date: \_\_\_\_\_  
Billing Address: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
Signature: \_\_\_\_\_

**(PLEASE PRINT OR TYPE)**

Last Name: \_\_\_\_\_ First: \_\_\_\_\_ Middle Int. \_\_\_\_\_

Job Title: \_\_\_\_\_ Social Security No. (optional): \_\_\_\_\_

Firm Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax : \_\_\_\_\_ E-mail: \_\_\_\_\_

Residence Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone: \_\_\_\_\_ Address Requested for Correspondence: \_\_\_\_\_ Business \_\_\_\_\_ Residence



**DIVISION III**

**EXPERIENCE RECORD (MAXIMUM POINTS 700)**

Applicant should forward one copy of the Employment Verification Form to each employer for those periods which apply to Certification Eligibility. Forms may be addressed to either immediate superiors or to personnel offices.

Please complete the following in chronological order. Include a description of lighting job functions held for those periods of employment, which qualify you for specific category of certification as applied for. This form may be copied if additional space is needed. **Most Recent Employment First**

|                  |                            |  |
|------------------|----------------------------|--|
| Date:<br>From-To | Employer<br>Name & Address | Concise Statement of Employment Experience<br>Please provide Lighting Efficiency Job Functions |
|                  |                            |  |
|                  | TITLE OF POSITION          |  |
|                  |                            |  |
| Date:<br>From-To | Employer<br>Name & Address | Concise Statement of Employment Experience<br>Please provide Lighting Efficiency Job Functions |
|                  |                            |  |
|                  | TITLE OF POSITION          |  |
|                  |                            |  |
| Date:<br>From-To | Employer<br>Name & Address | Concise Statement of Employment Experience<br>Please provide Lighting Efficiency Job Functions |
|                  |                            |  |
|                  | TITLE OF POSITION          |  |
|                  |                            |  |

Candidate may obtain 350 points for 3 years of full-time lighting experience; 50 points per year thereafter, up to a maximum of 700 points.

**Are you a Lighting Consultant:**                         Yes    No

## REFERENCES

Furnish the names and addresses of at least **two** references:

**The official AEE Certification Form for REFERENCES is to be forwarded by Applicant to the individuals listed below and returned directly by referees to AEE at the address indicated on the referral form.**

| Name | Company and Address | Position | Specify if referral is a P.E., R.A. or CEM |
|------|---------------------|----------|--|
|      |                     |          |  |
|      |                     |          |  |
|      |                     |          |  |
|      |                     |          |  |

## CLEP Applicant Signature / Obligation

I \_\_\_\_\_ (**Signature Required**), having completed the aforementioned to the best of my ability, do hereby apply for AEE Lighting Efficiency Professional and wish to take the CLEP Examination.

### Applicant Affidavit

I hereby agree (a) to be bound by terms and provisions of the Certificate of Incorporation of the Association of Energy Engineers, its by-laws and such other regulation as may from time to time be in force, so far as they may affect me; (b) to indemnify and hold harmless each and all of your members, Board of Directors, Certification Board, officers, examiners and agents from and against any liability whatsoever in respect to any act or omission by you or them or any of them in connection with this application, the examination, the grades given upon such examination, and/or the granting or issuance of o failure to grant o issue a certificate to me; (c) that any prescribed fee paid by me is not refundable; and (d) that any certificate granted or issued me shall remain the property of the Association. ***I certify that all the information contained in this application is correct to the best of my knowledge.***

I further pledge myself hereby to the highest ethical standards in the practice of energy engineering/management.

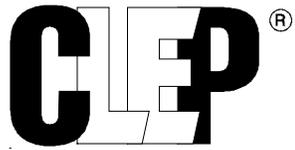
**Applicant Signature Required:** \_\_\_\_\_ **Date:** \_\_\_\_\_

Internal Use - Certification Board The AEE Certification Board, acting at its regular meeting on \_\_\_\_\_20\_\_\_\_ has  
 Use only \_\_\_\_\_ approved \_\_\_\_\_disapproved this application as presented for certification  
 classification \_\_\_\_\_ by \_\_\_\_\_,  
 No. \_\_\_\_\_.

\_\_\_\_\_  
 Secretary, AEE Certification Board

\_\_\_\_\_  
 Date

**DO NOT COMPLETE THIS SECTION / BOX**

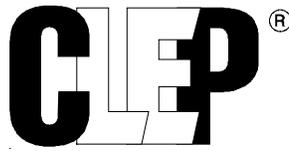


**LIGHTING PROJECT SUMMARY**

Please describe at least 4 lighting projects, new design or retrofit that you have been responsible or worked on in the past 10 years.

Applicant Name: \_\_\_\_\_

| Project Name & Description | Describe Your Role & Responsibilities | New or Retrofit | Number & Types of Fixtures (Old & New for Retrofit) | Type of Facility | Project Cost | Date of Completion |
|----------------------------|---------------------------------------|-----------------|---|------------------|--------------|--------------------|
| 1.                         |                                       |                 |   |                  |              |                    |
| 2.                         |                                       |                 |   |                  |              |                    |
| 3.                         |                                       |                 |   |                  |              |                    |
| 4.                         |                                       |                 |   |                  |              |                    |



## REQUEST FOR REFERENCE INFORMATION

### Certified Lighting Efficiency Professional

From: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

To: \_\_\_\_\_

Date: \_\_\_\_\_

Dear \_\_\_\_\_:

I am applying to the Association of Energy Engineers for Certification for Lighting Efficiency Professional. In this regard, I hereby authorize your release of the requested information.

Please furnish the requested information as completely as possible, and return to the AEE Certification Board.

The receipt of replies will be reported by AEE, but under no circumstances will the information be divulged to me, or used for any purpose except to validate my application for Lighting Efficiency Professional Certification.

Sincerely,

\_\_\_\_\_  
Applicant (Signature)

**APPLICANT PLEASE FILL IN (type or print) / Attach to Cover Letter**

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

**REFERAL PLEASE COMPLETE LETTER OF REFERENCE**

Date: \_\_\_\_\_

Name: \_\_\_\_\_

Company: \_\_\_\_\_ Telephone: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

The above named applicant I have known personally from  
\_\_\_\_\_ to \_\_\_\_\_

I am personally familiar with the professional work of the applicant  
\_\_\_\_\_yes \_\_\_\_\_no

If yes, please state relationship and brief description of character of work.

Do you know any reason why candidate should be denied certification?  
\_\_\_\_\_yes \_\_\_\_\_no

If yes, please state reason.

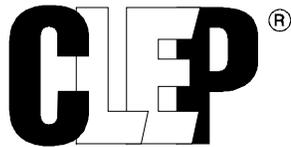
To the best of my knowledge, I hereby attest that the above information is true and correct.

Name of person supply information: \_\_\_\_\_  
(Please type or print)

Official Title of Respondent: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**Return to: AEE CERTIFICATION BOARD - CLEP  
3168 Mercer University Drive  
Atlanta, Georgia 30341**



**REQUEST FOR EMPLOYMENT AND  
JOB DUTIES VERIFICATION**

**Certified Lighting Efficiency Professional**

From: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

To: \_\_\_\_\_ Date: \_\_\_\_\_

Dear \_\_\_\_\_:

**I am applying to the Association of Energy Engineers for Certified Lighting Efficiency Professional. In this regard, I hereby authorize your release of the requested information enclosed which verifies my employment and duties from the period \_\_\_\_\_ to \_\_\_\_\_.**

**Please furnish the requested information as completely as possible, and return to the AEE Certification Board.**

**The receipt of replies will be reported by AEE, but under no circumstances will the information be divulged to me, or used for any purpose except to validate my application for Lighting Efficiency Professional Certification.**

\_\_\_\_\_  
Applicant (Signature)

**APPLICANT PLEASE FILL IN (type or print) / Attach to Cover Letter**

Date: \_\_\_\_\_

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

**LETTER OF EMPLOYMENT and JOB DUTIES VERIFICATION**

The following information verifies the employment and duties of the above applicant for

AEE Certification

Date: \_\_\_\_\_

Name: \_\_\_\_\_

Company: \_\_\_\_\_ Telephone: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

The above named applicant was (has been) employed by our company from

\_\_\_\_\_, to \_\_\_\_\_. Has held the following positions:

\_\_\_\_\_ Dates: \_\_\_\_\_

\_\_\_\_\_ Dates: \_\_\_\_\_

\_\_\_\_\_ Dates: \_\_\_\_\_

\_\_\_\_\_ Dates: \_\_\_\_\_

**Please describe in full the responsibilities of the applicant. Attach descriptions if necessary to answer fully. Please include lighting related details. (REQUIRED)**

To the best of my knowledge, and our employment records, I hereby attest that the above information is true and correct.

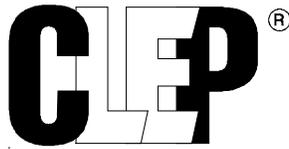
Name of person supplying information:

(Please print or type) \_\_\_\_\_

Official Title of Respondent \_\_\_\_\_

Signature \_\_\_\_\_ Date: \_\_\_\_\_

**Return to: AEE CERTIFICATION BOARD - CLEP  
3168 Mercer University Drive  
Atlanta, Georgia 30341**



## REQUEST FOR VERIFICATION OF ENGAGEMENT Certified Lighting Efficiency Professional

From: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

To: \_\_\_\_\_ Date: \_\_\_\_\_

Dear \_\_\_\_\_:

I am applying to the Association of Energy Engineers for Certification as a Lighting Efficiency Professional (CLEP). In this regard, I hereby authorize your release of the requested information enclosed which verifies my engagement and duties from the period \_\_\_\_\_ to \_\_\_\_\_.

Please furnish the requested information as completely as possible, and return to the AEE Certification Board.

The receipt of replies will be reported by AEE, but under no circumstances will the information be divulged to me, or used for any purpose except to validate my application for Lighting Efficiency Professional Certification.

\_\_\_\_\_  
Applicant (Signature)

**APPLICANT PLEASE FILL IN (type or print) / Attach to Cover Letter**

Date: \_\_\_\_\_

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

**Client Complete: LETTER OF CLIENT VERIFICATION**

The following information verifies the Contractor/Consultant and duties of the above applicant for AEE Certification

Client

Company: \_\_\_\_\_ Telephone: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

The above contractor/consultant has provided service(s) to our company from these dates:

Please describe in full the responsibilities of the applicant. Attach descriptions if necessary to answer fully. Please include energy-related details. (REQUIRED)

To the best of my knowledge, I hereby attest that the above information is true and correct.

Name of person supply information: \_\_\_\_\_

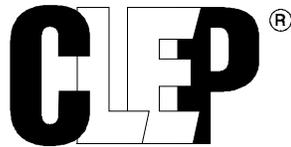
(Please type or print)

Official Title of Respondent: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Applicant: Please provide (3) client verifications from (3) different companies. Photocopies are acceptable.

**Return to: AEE CERTIFICATION BOARD-CLEP  
3168 Mercer University Drive  
Atlanta, Georgia 30341**



## Part C: STUDY GUIDE

### CERTIFIED LIGHTING EFFICIENCY (CLEP® EXAM)

#### CERTIFIED LIGHTING EFFICIENCY PROFESSIONAL EXAM

The following is a list of subjects for the CLEP examination. Each subject covers a number of topics. The list of topics is suggested references. The CLEP examination may contain additional subjects. The two primary references are Applied *Illumination Engineering Reference Book* and ASHRAE/IES Standard 90.1

The examination will be an open book and allows four hours for completion of exam. The types of questions presented are multiple choice and true and false. The total maximum score on the exam is 1000. The written examination has 10 sections, which include:

|                       |              |                                    |              |
|-----------------------|--------------|------------------------------------|--------------|
| Codes & Standards     | 10 questions | Lighting Controls                  | 10 questions |
| Lighting Evaluation   | 15 questions | Lighting System Maintenance        | 10 questions |
| Lighting Fundamentals | 10 questions | Quantity & Quality of Illumination | 10 questions |
| Design Basics         | 15 questions | Environmental & Safety             | 10 questions |
| Lamps & Ballast       | 10 questions | DSM & Lighting Efficiency          | 10 questions |

---

#### STUDY GUIDE TOPICS & REFERENCES

---

##### 1. Codes & Standards

- 1.1 ASHRAE/IES Standard 90.1
- 1.2 National Electrical Code
- 1.3 Certified Ballast Manufacturers Association Standards
- 1.4 ANSI Standard for Fluorescent Lamps

RE: *ASHRAE/IES Standard 90.1; Applied Illumination Engineering Reference*

##### 2. Lighting Evaluation & Economics

- 2.1 Interest Formulas
- 2.2 Interest Tables
- 2.3 Rate of Return Analysis
- 2.4 Payback Analysis
- 2.5 Effect of Fuel Escalation on Life-Cycle Costing
- 2.6 Economic Comparisons of Lighting Systems

RE: *Applied Illumination Engineering*

### **3. Lighting Fundamentals**

- 3.1 Nature of Light
- 3.2 Color Temperature
- 3.3 Color Rendering Index
- 3.4 Fundamental Lighting Units & Relationship
- 3.5 Fundamental Lighting Calculations
- 3.6 Photometric Test Reports
- 3.7 Candela Distribution Curves
- 3.8 Coefficient of Utilization
- 3.9 Lamp Lumen Depreciation
- 3.10 Inverse Square Law

*RE: Applied Illumination Engineering*

### **4. Design Basics**

- 4.1 Zonal Cavity Method
- 4.2 Determination of Effective Cavity Reflectance
- 4.3 Calculating Illumination at a Point
- 4.4 Light Loss Factor
- 4.5 Energy Management
- 4.6 Types of Lighting Systems
- 4.7 Typical Lighting applications
  - a. Industrial
  - b. Office
  - c. Outdoor
  - d. Merchandise
  - e. Educational

*RE: Applied Illumination Engineering*

### **5. Lamps & Ballasts**

- 5.1 Light Sources
  - a. Incandescent Lamps
  - b. Reflector Lamps
  - c. Fluorescent Lamps
  - d. High Intensity Discharge Lamps
    - 1. Mercury Vapor
    - 2. Metal Halide
    - 3. Low Pressure Sodium
    - 4. High Pressure Sodium
  - e. Halogen Cycle PAR Lamps
  - f. Tubular Quartz Lamps
- 5.2 Ballast
  - a. Ballast Factor
  - b. Ballast Efficacy Factor
  - c. Electronic Ballasts
  - d. Magnetic Ballasts

*RE: Applied Illumination Engineering*

## **6. Lighting Controls**

- 6.1 Automatic Switches & Time Clocks
- 6.2 Photocells
- 6.3 Occupancy Sensors
  - a. Ultrasonic
  - b. Infrared
- 6.4 Dimmers
- 6.5 Contractors
- 6.6 Hard Wiring
- 6.7 Power Line Carriers

*RE: Applied Illumination Engineering*

## **7. Lighting System Maintenance**

- 7.1 Group Relamping
- 7.2 Luminaire Dirt Depreciation
- 7.3 Room Surface Dirt Depreciation

*RE: Applied Illumination Engineering*

## **8. Quantity & Quality of Illumination**

- 8.1 Psychological Factors
- 8.2 Physical Factors
- 8.3 Luminance Ratios
- 8.4 Measuring Quantity of Illuminance
- 8.5 Disability Glare
- 8.6 Discomfort Glare
- 8.7 Veiling Reflections
- 8.8 Visual Comfort Probability

*RE: Applied Illumination Engineering*

## **9. Environmental & Safety**

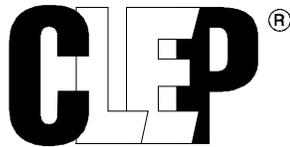
- 9.1 EPA Energy Star Program
- 9.2 Disposal of Old Lamps and Ballasts
- 9.3 Safety Considerations for Metal Halide & Mercury Vapor Lamps

*RE: Applied Illumination Engineering*

## **10. DSM & Lighting Efficiency**

- 10.1 Unit Power Density
- 10.2 Utility Incentive and Rebate Programs
- 10.3 Demand-Side Management
- 10.4 Energy Management Considerations
- 10.5 EPA

*RE: ASHRAE Standard 90.1; Applied Illumination Engineering*



## CEM EXAM REVIEW QUESTIONS (Sample Only)

*Some of these review questions may be more complex or difficult than the exam but will be good practice problems.*

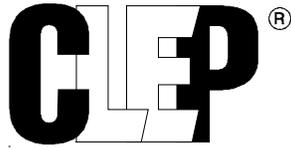
### CERTIFIED LIGHTING EFFICIENCY PROFESSIONAL (CLEP) Sample Exam QUESTIONS

- In applying ASHRAE/IES Standard 90.1 to calculate unit lighting power allowance (ULPA), no credit is allowed for which of the following types of lighting control when calculating lighting power control credits (LPCC)?
  - Daylight sensing
  - Occupancy Sensors
  - Programmable Timers
  - Interval timers
- What is the internal rate of return, before taxes, on an investment for upgrading lamps which will cost \$50,000 to install, have a three-year life, and result in cost savings of \$ 25,615 each year?
  - 17 %
  - 25%
  - 51 %
  - 65 %
- In normal operation, which lamp type exhibits the worst lumen depreciation?
  - Mercury Vapor
  - Low Pressure Sodium
  - Metal Halide
  - T12 "Energy-saving" Fluorescent
- How many luminaires are required given the following:

|                             |                    |
|-----------------------------|--------------------|
| Area:                       | 50,000 square feet |
| Required foot-candle level: | 50 fc              |
| Coefficient of Utilization: | .76                |
| Light Loss Factor           | .65                |

1 lamp, 400 watt high pressure sodium luminaires. Lamps have an initial lumen rating of 50,000
  - 25
  - 102
  - 150
  - 494

5. What is the total light loss factor given the following:
- |                                    |      |
|------------------------------------|------|
| Ballast factor                     | 0.94 |
| Lamp lumen depreciation factor     | 0.84 |
| Luminaire dirt depreciation factor | 0.90 |
| Room surface dirt depreciation     | 0.98 |
- A) 0.90  
B) 0.82  
C) 0.70  
D) 0.62
6. Using the inverse-square law, calculate the illuminance at a point on a merchandising display directly beneath a halogen reflector lamp, given the following:
- One (1) 150 Watt PAR 38 Spot Halogen, rated at 25,000 candle power  
Mounted on the ceiling, 15 feet from the floor  
Lighting measurement taken perpendicular to lamp's beam axis, 5 1/2 feet from the floor.
- A) 100 fc  
B) 166 fc  
C) 200 fc  
D) 277 fc
7. The term VCP refers to which of the following?
- A) Veiling Coefficient of Performance  
B) Vaulted Ceiling Pendant  
C) Visual Comfort Probability  
D) Virtual Color Planes
8. Which HID lamp has normally the slowest re-strike time after a momentary power interruption?
- A) Mercury Vapor  
B) Metal Halide  
C) High Pressure Sodium  
D) Compact Fluorescent
9. Which of the following lamp and ballast combinations generally have the poorest power factor?
- A) Compact Fluorescent with integral electronic ballast  
B) Compact Fluorescent with magnetic Ballast  
C) High Pressure Sodium with auto regulating ballast  
D) T8 Fluorescent with Electronic Ballast
10. Which of the following is not a characteristic of typical metal halide lamps in normal operation?
- A) Change in lumen output with change in mounting position  
B) Change in CRI during life  
C) Non-Passive End-of-Life  
D) Lumen depreciation greater than 50%



CLEP EXAM REVIEW ANSWER KEY:

- |    |    |     |    |
|----|----|-----|----|
| 1. | D. | 6.  | D. |
| 2. | B. | 7.  | C. |
| 3. | A. | 8.  | B. |
| 4. | B. | 9.  | B. |
| 5. | C. | 10. | D. |

For a listing of AEE Certification Programs: Visit [www.aeecenter.org/certification](http://www.aeecenter.org/certification)

For a listing of Seminars: Visit [www.aeecenter.org/seminars](http://www.aeecenter.org/seminars)

For a listing of Real-time Online Seminars: Visit [www.aeecenter.org/realtime](http://www.aeecenter.org/realtime)

For a listing of Remote Testing Centers (Assessment Systems): Visit [www.aeecenter.org/certifiormap](http://www.aeecenter.org/certifiormap)

For AEE Membership Info: Visit [www.aeecenter.org](http://www.aeecenter.org)

CLEP® Certified Lighting Efficiency Professional is a registered trade mark of the Association of Energy Engineers. The information contained herewith is for informational purposes only and does not imply endorsement from AEE in any kind.

CLEP application, procedures, requirements, and eligibility are subject to change.