

## DOCKETED

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<b>Project Title:</b>	2016 Nonresidential Compliance Manual and Documents
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*Comment Received From: ROBERT A. SHEARER*

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**NRCA-LTI-03-A Incorrect Instruction(s)**

*Additional submitted attachment is included below.*

Aug 28th, 2015

California Energy Commission  
Building Energy Efficiency Standard Rulemaking - Dockets Unit  
1516 Ninth Street, MS 4  
Sacramento, CA 95814-5512  
[docket@energy.ca.gov](mailto:docket@energy.ca.gov)

Robert A. Shearer, BSEE  
1842 Phillips Way  
Los Angeles, CA 90042-1039  
(925)-640-0181  
[CET\\_BOB@roadrunner.com](mailto:CET_BOB@roadrunner.com)

COMMENT PERIOD  
RE: 2016 Nonresidential  
Compliance Manual and Documents

**Re: Docket # 15-BSTD-05**  
**2016 Acceptance Testing Forms: Comment 05**

***INTRODUCTION:***

The author is primarily concerned with changes to the Lighting Controls Acceptance Certification Forms included in the back of the 2016 Nonresidential Compliance Manual and will reserve comments on the other content of this manual.

***ABSTRACT:***

An improper “conditional” statement exists in two places on Form: NRCA-LTI-03-A; the Daylighting Acceptance Form. These errors are related to a PASS/FAIL criteria nicknamed: “The Sufficient Illumination Test”. As it is unknown why this design criteria appears on the form, a detailed discussion with ensue to attempt to explain to the reader:

- 1) Why this PASS/FAIL Test exists; and,
- 2) Why the “conditional” in the formula block is wrong, and why it should simply be removed.

***COMMENTS:***

For an AUTOMATIC DAYLIGHTING CONTROL System with a *CONTINUOUS DIMMING* Output: An additional Acceptance Test Exists; the “Sufficient Illumination Test”. This is found on (Page 3 of 11) line l. and (Page 6 of 11) line k. of Form: NRCA-LTI-03-A.

This PASS/FAIL requirement is not shown as a Design Requirement elsewhere in the code and seeks to ensure that the Controlled Lighting is not “Tuned Down” below 30% of the Full Output of the luminaires in question.

As this does not exist as a design or control criteria elsewhere in the code, this might be referred to as an “underground standard” and technically lies outside the law. But – there may be a rational explanation for its existence.

## DISCUSSION:

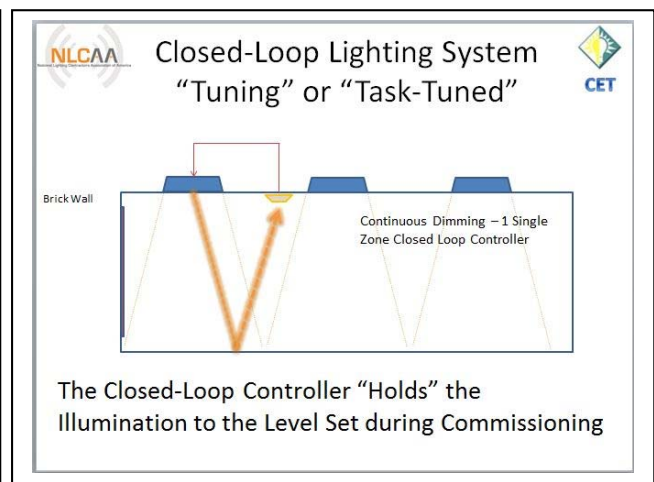
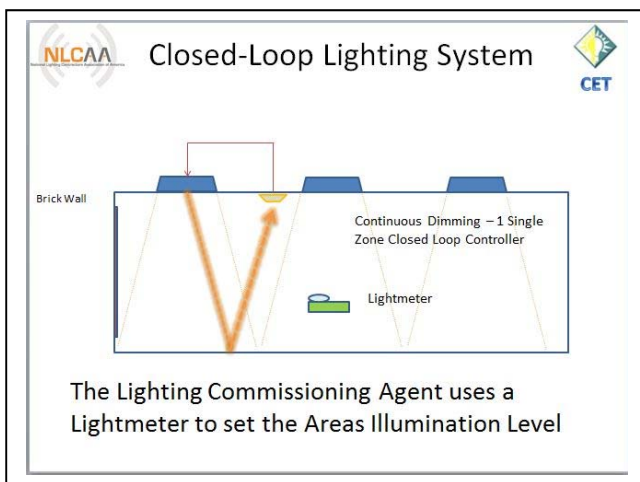
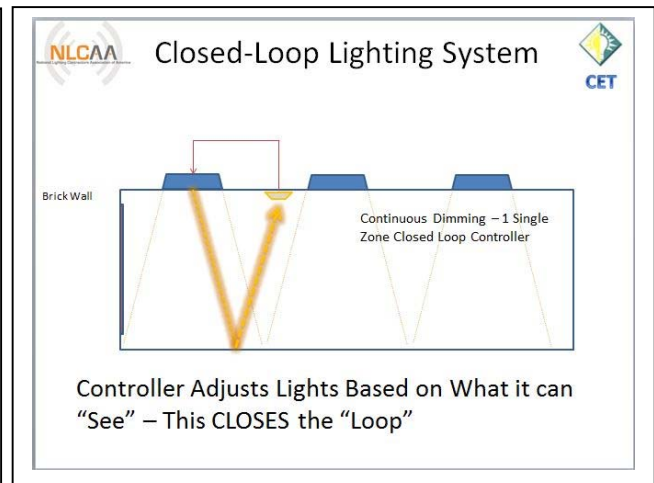
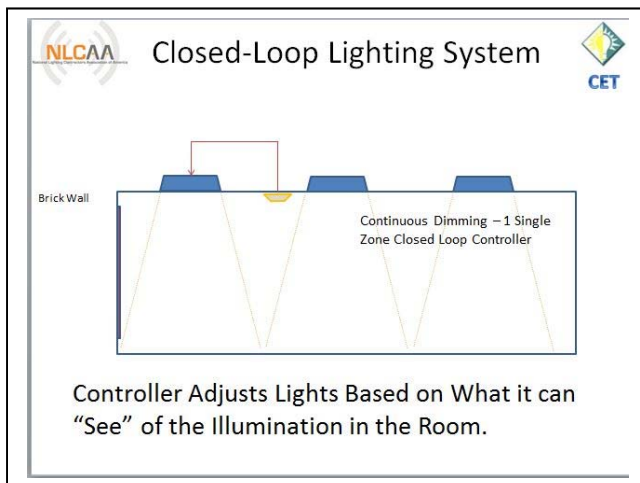
Why would such a criteria exist? What would be its purpose? It is the authors' *opinion* that it has to do with the advent of LED lighting for general illumination: Please indulge me.

Unlike many traditional lighting sources, such as incandescent or fluorescent, the "rated life" of LED emitters is not based on outright failure; but rather optical output. The rated life of a fluorescent "tube" is rated per the failure of 50% of a sample group – empirically tested, or extrapolated. LED emitters are different. The rated life of a LED luminaire is based on how long it takes the "Lamp"/Driver combination to "dim-down" by 30%. Hmmm ... why that's the figure on the form!

So: It works like this; if you "Tune down" continuously dimmed LED luminaires in a system using Automatic Lumen Maintenance by more than 30%; then that system will be driven "out-of-specs" near the end of its useful life! As it turns out, all *closed-loop* Daylighting Systems with continuously dimmed luminaires have Automatic Lumen Maintenance built in.

Don't believe me? Let's have a look ...

The following material is from *both* the NLCAA Employer *and* Technician courses, (written by the author, © 2014, RAW Shearer):



NLCAA Closed-Loop Lighting System As lamps Dim due to Age or Dust CET

Brick Wall

Continuous Dimming – 1 Single Zone Closed Loop Controller

The Closed-Loop Controller “Adjusts” the Illumination to the Level Set during Commissioning

NLCAA Closed-Loop Lighting System “Lumen Maintenance” CET

Brick Wall

Continuous Dimming – 1 Single Zone Closed Loop Controller

The Closed-Loop Controller “Holds” the Illumination to the Level Set during Commissioning

NLCAA Closed-Loop Lighting System Itching, Burning Question CET

Brick Wall

Continuous Dimming – 1 Single Zone Closed Loop Controller

What will the controller do to the rooms illumination level – If We COVER the Sensor?

NLCAA Closed-Loop Lighting System Better Question CET

WINDOW

Continuous Dimming – 1 Single Zone Closed Loop Controller

What if we Replace the Brick Wall with a Large Window?

NLCAA Closed-Loop Daylighting System CET

WINDOW

Continuous Dimming – 1 Single Zone Closed Loop Controller

Primary Sidelit Secondary Sidelit Other General Lighting

NLCAA

ACCEPTANCE TEST TECHNICIAN TRAINING

AUTOMATIC DAYLIGHTING SYSTEMS

R. Shearer, BSEE

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**The answer to: What happens if we cover the Sensor is: The lighting should attempt to reach “Full Output”.**

But ... suppose we cover the sensor under “No Daylight Conditions” and: nothing happens? We are looking at a “Full Output System” ... and the “Reference Illumination” *will equal* the “Full Output” Illumination.

Therefor: The conditional “If line X = FO” is nonsensical, and this Form Scrap should be deleted.

**EVIDENCE:**

A cursory examination of this Acceptance Testing Form will disclose these errors.

ON (PAGE 3 of 11)

I.	<b>Enter Y if either of the following statements are true:</b> [Reference Illuminance (line k)] / [Highest light level fc (line g)] > 70% when line i = FO or [Reference Illuminance (line k)] / [design footcandles (line d)] > 80%? (Y/ N)
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... You can keep the “or” but delete: “when line I =FO”

ON (PAGE 6 of 11)

k.	<b>Enter Y if either of the following statements are true:</b> If line h = FO; [Reference Illuminance (line j)] / [Full Output fc (line g)] > 70%? or [Reference Illuminance (line j)] / [design footcandles (line d)] > 80%? (Y/ N)
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Delete “If line h = FO;”

**CORRECTIONS REQUIRED:**

Please see: “**EVIDENCE**” above and delete the “FO” conditionals shown.

**CONCLUSION:**

The author extends his gratitude for the opportunity of performing a review of a form which is signed under penalty of perjury by Contractors and Field Technicians in the State of California.

Thank you for considering my comments,

Robert A. Shearer, BSEE