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California Energy Commission
Building Energy Efficiency Standard Rulemaking - Dockets Unit
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Re: Docket # 15-BSTD-01
15-day 2016 Building Energy Efficiency Standards Section 130.1 (d) 2. D. iv.: Incorrect change to Code Language

***INTRODUCTION*:**

A change in the specification to the required daylight level for Power reduction, ("Full Daylight Testing"), is *incorrect*.

ABSTRACT:

Acceptance Test Technicians must complete Acceptance Testing, ("NRCA"), Certificates in an honest, repeatable, and verifiable manner: Section 130.1 (d) *should* accurately reflect the Acceptance Test criteria; even if just in the broadest terms.

THE ARGUMENT:

The modified code language in the 15-day 2016 Building Energy Efficiency Standards, Section 130.1 (d) 2. D. iv. is shown below:

> iv. In areas served by lighting that is daylight controlled, when the combined illuminance ~~received from the daylight~~ is greater than 150 percent of the design illuminance received from the general lighting system at full power, the general lighting power in that daylight zone shall be reduced by a minimum of 65 percent.

As this language is meant to relate to *all* Automatic Daylighting Systems – (including step-switched, or step-dimmed), it is incorrect. In order to be *more*, (but not completely), correct – this code language change should be discarded in favor of the original code language.

Combined Illumination is required to be measured for any type of Automatic Daylighting System under test for the Partial Daylight phase of Acceptance testing, and a description of this testing will show that a Combined illuminance reading is incorrect when used during the Full Daylight testing to assure proper power reduction.

EVIDENCE:

The Partial Daylight test is used to demonstrate proper operation, ("tracking"), of an Automatic Daylighting Control system. During this testing for a step-switched or step-dimmed system the *Combined Illuminance* at the reference location is allowed, (in some instances: expected), to exceed 150% of Reference *and/or* Full Output Illuminance *before* "full power reduction" is achieved.

Partial Daylight Combined Illuminance is only required to fall below 150% of Reference Illuminance when a stage of lighting just turns off or step-dims. This implies that the *Combined Illuminance* may be expected to *Exceed* 150% of Reference Illumination, (typically "Full Output Illuminance" in this type of system), at differing points during system operation.

The data entry spots from form, NRCA-LTI-03-A are shown below:

		Applicable Control System		
		A	**B**	**C**
First Stage of Control				
F1	Total (daylight + electric light) illuminance measured at the Reference Location (foot-candles) when stage turns off or dims			
F2	Is the measured total illuminance between 100% and 150% of the Reference Illuminance (line g)? (**Y/N**)			
F3	With time delay disabled, control stage does not cycle (i.e. deadband is sufficient)? (**Y/N**)			
Second Stage of Control				
F4	Total (daylight + electric light) illuminance measured at the Reference Location (foot-candles) when stage turns off or dims			
F5	Is the measured total illuminance between 100% and 150% of the Reference Illuminance (line g)? (**Y/N**)			
F6	With time delay disabled, control stage does not cycle (i.e. deadband is sufficient)? (**Y/N**)			
Third Stage of Control				
F7	Total (daylight + electric light) illuminance measured at the Reference Location (foot-candles) when stage turns off or dims			
F8	Is the measured total illuminance between 100% and 150% of the Reference Illuminance (line g)? (**Y/N**)			
F9	With time delay disabled, control stage does not cycle (i.e. deadband is sufficient)? (**Y/N**)			

This testing is identical whether the Illuminance or Power method of testing is used.

So … the combined illuminance measured at the reference location is *allowed* to exceed 150% of Reference Illumination before even one stage of lighting steps off. This renders a Combined Illumination level *useless* for power reduction testing in this sort of system. Also note: the "No Daylight" Electric Illuminance in a stepped system will typically be "Full output".

The illustration from chapter 13 of the Nonresidential Compliance Manual, (next page), shows this graphically:

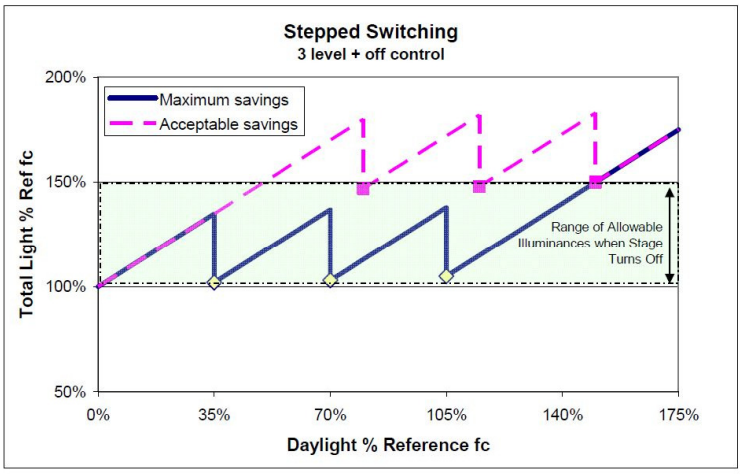

Figure 13-116 – Performance of compliant switching controls - total light (daylight + electric light) versus daylight

While many, many things in the *text* of the 2013 Nonresidential Compliance Manual are incorrect, the *illustrations* involving Automatic Daylight Controls all appear to be correct.

CONCLUSION:

Acceptance Testing of Automatic Daylighting Control systems appears to be a confusing subject for some individuals. The 2016 Building Energy Efficiency Standards should not add to this confusion by containing design language which cannot be reconciled with Acceptance Testing procedures.

It is recommended that the change to Section 130.1 (d) 2. D. iv. Be reversed.

Thank You,

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