DEMAND RESPONSIVE LIGHTING CONTROL ACCEPTANCE DOCUMENT

CERTIFICATE OF ACCEPTANCE		NRCA-LTI-04-A
Demand Responsive Lighting Control Acceptance Document		(Page 1 of 6)
Project Name:	Enforcement Agency:	Permit Number:
Project Address:	City:	Zip Code:

Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

A. Demand Responsive Lighting Control	
Intent:	Test the reduction in lighting power due to the demand responsive lighting control as per Sections 110.9(a), 130.1(e) and 130.5(e).
NA7.6.3 Acceptance tests for Demand Responsive Lighting Controls in accordance with Section 130.1(e)	
01. Instrumentation to perform test includes, but not limited to:	
a.	Hand-held amperage and voltage meter
b.	Power meter
c.	Light meter

B. Construction Inspection		
☐	Verify the demand responsive control is capable of receiving a demand response signal directly or indirectly through another device and that it complies with the requirements in Section 130.1(e).	
	130.5(e)	Demand responsive controls and equipment, where installed, shall be capable of receiving and automatically responding to at least one standards based messaging protocol which enables demand response after receiving a demand response signal.
	Definition	DEMAND RESPONSE SIGNAL is a signal sent by the local utility, Independent System Operator (ISO), or designated curtailment service provider or aggregator, to a customer, indicating a price or a request to modify electricity consumption, for a limited time period.
☐	If the demand response signal is received from another device (such as an EMCS), that system must itself be capable of receiving a demand response signal from a utility meter or other external source.	

C. NA7.6.3.2 Functional Test		
01	☐	Use <u>either</u> Method 1 (illuminance measurement) or Method 2 (current input measurement) to perform the functional test.
02	☐	Test building-wide reduction in lighting power to at least 15% below the maximum total lighting power, as calculated on an area-weighted basis (measured in illuminance or power). However, any single space must not reduce the combined illuminance from daylight and electric light to less than 50% of the design illuminance.
03	☐	For buildings with up to seven (7) enclosed spaces requiring demand responsive lighting controls, all spaces shall be tested.
04	☐	For buildings with more than seven (7) enclosed spaces requiring demand responsive lighting controls, sampling may be done on additional spaces with similar lighting systems. If the first enclosed space with a demand responsive lighting control in the sample group passes the acceptance test, the remaining building spaces in the sample group also pass. If the first enclosed space with a demand responsive lighting control in the sample group fails the acceptance test the rest of the enclosed spaces in that group must be tested.
05	☐	If any tested demand responsive lighting control system fails it shall be repaired, replaced or adjusted until it passes the test.

D. Method 1: Illuminance Measurement

In each space, select one location for illuminance measurement. The chosen location must not be in a skylit or primary sidelit area,. When placed at the location, the illuminance meter must not have a direct view of a window or skylight. If this is not possible, perform the test at a time and location at which daylight illuminance provides less than half of the design illuminance. Mark each location to ensure that the illuminance meter can be accurately located.

Step 1: Full output test		Space number						
		01	02	03	04	05	06	07
a.	Using the manual switches/dimmers in each space, set the lighting system to design full output. Note that the lighting in areas with photocontrols or occupancy/vacancy sensors may be at less than full output, or may be off.							
b.	Take one illuminance measurement at a representative location in each space, using an illuminance meter.	fc	fc	fc	fc	fc	fc	fc
c.	Simulate a demand response condition using the demand responsive control.							
d.	Take one illuminance measurement at the same locations as above, with the electric lighting system in the demand response condition.	fc	fc	fc	fc	fc	fc	fc
e.	Turn off the electric lighting and measure the daylighting at the same location (if present).	fc	fc	fc	fc	fc	fc	fc
f.	Calculate the reduction in illuminance in the demand response condition, compared with the design full output condition. (b-d)/d x 100%	%	%	%	%	%	%	%
g.	Note the area of each controlled space	ft^2	ft^2	ft^2	ft^2	ft^2	ft^2	ft^2
h.	Calculate the area-weighted reduction in the demand response condition using the formula shown in the box to the right. The area-weighted reduction must be at least 0.15 (15%).	$\frac{(f1\times g1)+(f2\times g2)+(f3\times g3)+\cdots}{[g1+g2+g3+\cdots]} = \frac{\quad}{Y/N}$						
i.	The area-weighted reduction must not reduce the combined illuminance from electric light and daylight to less than 50% of the design illuminance in any individual space . (Line f should not be more than 50%.)	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N

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Step 2: Minimum output test								
a.	Using the manual switches/dimmers in each space, set the lighting system to minimum output (but not off). Note that the lighting in areas with photocontrols or occupancy/vacancy sensors may be at more than minimum output, or may be off.							
b.	Take one illuminance measurement at each location, using an illuminance meter.	fc	fc	fc	fc	fc	fc	fc
c.	Simulate a demand response condition using the demand responsive control.							
d.	Take one illuminance measurement at each location with the electric lighting system in the demand response condition.	fc	fc	fc	fc	fc	fc	fc
e.	In each space, the illuminance in the demand response condition must not be less than the illuminance in the minimum output condition or 50% of the design illuminance, whichever is less.	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
EXCEPTION: In daylit spaces, the illuminance in the demand response condition maybe below the minimum output setting, but in the demand response condition the combined illuminance from daylight and electric light must be at least 50% of the design illuminance.								

E. Method 2: Current Measurement

At the lighting circuit panel, select at least one lighting circuit that serves spaces required to meet Section 130.1(b) to measure the reduction in electrical current. Alternatively, employ the monitoring capabilities of the DR controls system to monitor the circuits in the tests below. The testing process is constant with either approach.

		Circuit number						
Step 1: Full output test		01	02	03	04	05	06	07
a.	Using the manual switches/dimmers in each space, set the lighting system to full output. Note that the lighting in areas with photocontrols or occupancy/vacancy sensors may be at less than full output, or may be off.							
b.	Take one electric current measurement for each selected circuit.	A	A	A	A	A	A	A
c.	Simulate a demand response condition using the demand responsive control.							
d.	Take one measurement at each circuit location with the electric lighting system in the demand response condition.	A	A	A	A	A	A	A
e.	Calculate the reduction in current in the demand response condition, compared with the full output condition [(b-d)/b] x 100%	%	%	%	%	%	%	%
f.	Note the area of each controlled space.	ft^2	ft^2	ft^2	ft^2	ft^2	ft^2	ft^2
g.	Calculate the reduction in the demand response condition, using the formula shown in the box to the right. The area-weighted reduction must be at least 15% (0.15).	$\frac{[(e_1 x f_1) + (e_2 x f_2) + (e_3 x f_3) + (e_4 x f_4) + (e_5 x f_5) + (e_6 x f_6) + (e_7 x f_7)]}{(f_1 + f_2 + f_3 + f_4 + f_5 + f_6 + f_7)} = \frac{}{Y/N}$						
h.	The area-weighted reduction must not reduce the output of any individual circuit by more than 50%. (Line e should not be more than 50%.)	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N

Step 2: Minimum output test								
a.	Using the manual switches/dimmers in each space, set the lighting system to minimum output (but not off). Note that the lighting in areas with photocontrols or occupancy/vacancy sensors may be at more than minimum output, or may be off.							
b.	Take one electric current measurement for each selected circuit location.	A	A	A	A	A	A	A
c.	Simulate a demand response condition using the demand responsive control.							
d.	Take one electric current measurement for each circuit with the electric lighting system in the demand response condition.	A	A	A	A	A	A	A
e.	In each space, the electric current in the demand response condition must not be less than the current in the minimum light output condition or 50% of current value at design illuminance level, whichever is less.	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
EXCEPTION: Circuits that supply power to the daylit portion of enclosed spaces as long as lighting in non-daylit portions of the space are not reduced below the lesser of 50% power input level or the minimum light output condition.								

F. Evaluation	
☐	PASS: All applicable **Construction Inspection** responses are complete and all applicable **Equipment Testing Requirements** responses are positive (Y - yes)

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DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

1. I certify that this Certificate of Acceptance documentation is accurate and complete.

Documentation Author Name:	Documentation Author Signature:
Documentation Author Company Name:	Date Signed:
Address:	CEA/ATT Certification Identification (If applicable):
City/State/Zip:	Phone:

FIELD TECHNICIAN'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Acceptance is true and correct.
2. I am the person who performed the acceptance verification reported on this Certificate of Acceptance (Field Technician).
3. The construction or installation identified on this Certificate of Acceptance complies with the applicable acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
4. I have confirmed that the Certificate(s) of Installation for the construction or installation identified on this Certificate of Acceptance has been completed and signed by the responsible builder/installer and has been posted or made available with the building permit(s) issued for the building.

Field Technician Name:	Field Technician Signature:	
Field Technician Company Name:	Position with Company (Title):	
Address:	ATT Certification Identification (if applicable):	
City/State/Zip:	Phone:	Date Signed:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. I am the Field Technician, or the Field Technician is acting on my behalf as my employee or my agent and I have reviewed the information provided on this Certificate of Acceptance.
2. I am eligible under Division 3 of the Business and Professions Code in the applicable classification to accept responsibility for the system design, construction or installation of features, materials, components, or manufactured devices for the scope of work identified on this Certificate of Acceptance and attest to the declarations in this statement (responsible acceptance person).
3. The information provided on this Certificate of Acceptance substantiates that the construction or installation identified on this Certificate of Acceptance complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
4. I have confirmed that the Certificate(s) of Installation for the construction or installation identified on this Certificate of Acceptance has been completed and is posted or made available with the building permit(s) issued for the building.
5. I will ensure that a completed, signed copy of this Certificate of Acceptance shall be posted, or made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a signed copy of this Certificate of Acceptance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Acceptance Person Name:	Responsible Acceptance Person Signature:	
Responsible Acceptance Person Company Name:	Position with Company (Title):	
Address:	CSLB License:	
City/State/Zip:	Phone:	Date Signed:

NRCA-LTI-04-A User Instructions

This compliance document is used to document the results for demand responsive lighting controls tests. The compliance document was designed so that data for up to seven spaces could be recorded on one document. The compliance document is separated into the following sections: project information; construction inspection; functional test; evaluation; and certification statement. Each section consists of a combination of data entry requirements and check boxes.

Construction Inspection (Pre-test Inspection)

This section consists of check boxes. Complete check boxes as instructed.

Functional Test

This section begins with general requirements and follows by individual test procedures for two methods, Illuminance Measurement method and Current Measurement method. One of the two methods shall be selected for the acceptance test.

Evaluation

Check the appropriate box as instructed.

Certification Statement

The statement of compliance is signed by the person responsible for performing the test and verifying system performance. The signatory provides the following: name; company name; signature and date signed; as well as license number and expiration date.