



Brutal Honesty About Commissioning in California

Lyn Gomes, PE, CCP, LC, LEED AP
DPR Construction
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Commissioning Basics



Commissioning Fundamentals

Not just testing at the end...

Cx is a process!

- *Owners needs*
- *Custom*
- *Focus:*
 - *Quality*
 - *Energy*

Includes startup

Codes/Standards define Cx scope



What is Cx?

Why do we do all these steps?

OPR (Owner's Project Requirements)

- *Review is optional*

BOD (Basis of Design)

- *Review is optional*

Cx Specs

Cx Plan

Design review

- *NRCC-CXR Forms*
- *Exempt: < 10,000 SF: exempt*
- *In house: 10-50,000 SF*
- *Third party*
 - *>10,000 SF & complicated mechanical system*
 - *>50,000 SF*

Design Phase

Title 24 Sec 120.8

*Who is qualified?
Enforcement?*

Qualifications & liability

Qualified to perform commissioning(1):

- *Architects*
- *Engineers*
- *Contractors*

Why not commissioning providers?

- *Liability?*
- *Accountability?*

COMMISSIONING PROVIDERS CANNOT AND SHOULD NOT MAKE ARBITRARY CHANGES TO THE DESIGN

ANSI-Accredited Commissioning Provider (2)

- *Rigid federal standard*
- *Specialized field experience*
- *ANSI/ISO/IEC 17024:2012 accredited organization*

(1) Per Section 10-103(a)1 & Division 3 of the Business and Professions Code

(2) The Professional Engineering license is ANSI-accredited



Item	Description of Issue	Building, Drawing, Specification	Recommended Changes	Response	Backcheck
21.	The BOD states that all lighting luminaires in this project will be controlled to meet the requirement of 2013 Title 24. The daylight zone areas in Floors 1-3 are not outlined on the lighting plans, and it is unclear which fixtures will be controlled by photocells. Note that multiple drivers may be required for fixtures that span multiple daylight zones.	BOD, E2.01, E2.02, E2.03	Outline the primary and secondary daylight zone areas on each floor to comply with the BOD and 2013 T24 Sections: § 130.1 (d) 2 A (primary and skylit), § 140.6 (d) 3 (secondary daylight zones) Add notes to the schedule to specify multiple drivers for fixtures that span multiple zones.		NOT RESOLVED



CO2 “Control”

Functional Testing

- *By contractor, engineer, or architect*
- *No third party requirement*
- *Acceptance Tests accepted?*

System deficiencies resolved through change management process

- *Not by the CxP's direction!!*

Cx Report

Systems Manual

Construction Phase

Title 24 Sec 120.8

Submittal review?

Training requirement?

*Acceptance tests in lieu of
functional testing?*

Who is qualified?

Enforcement?

Acceptance Testing

Standard test

Tests to code, not design

Performed by certified tester (ATT)

- Almost always hired by contractor

Required for occupancy

Acceptance testing

[Read more here](#)

The image shows three overlapping forms from the California Energy Commission, each titled "CERTIFICATE OF ACCEPTANCE".

- Left Form:** "SHUT-OFF LIGHTING CONTROL ACCEPTANCE DOCUMENT" (NRCA-LTI-02-A). It includes a "Compliance Results" section with a checkbox for "COMPLIES or DOES NOT COMPLY" and a "Notes" section. A specific note states: "This document is used to demonstrate compliance with acceptance requirements in [2501.50\(4\)](#) and Reference Norms/standards Appendix [NA7.6.2](#) for shut-off lighting controls. Attach additional sets of pages 1 through 3, as required, for all controls that must be tested." Below this is a section for "Automatic Time Switch Lighting Controls" with a checklist of items (a-f) to be verified.
- Middle Form:** "DEMAND CONTROL VENTILATION SYSTEMS ACCEPTANCE" (NRCA-MCH-05-A). It includes a "Notes" section with a reference to "2501.50(4) can vary outside ventilation flow in the system that must demonstrate compliance."
- Right Form:** "LAB EXHAUST VENTILATION SYSTEM ACCEPTANCE DOCUMENT" (NRCA-PIC-14-F). It includes a "Notes" section with a reference to "Requirements in [2501.50\(4\)](#) and Reference Norms/standards Attach additional sets of pages 1 through 3, as required, for all systems to be completed."

The project:

- Occupancy sensors integrated with VAV boxes
- 30 minute timeout (per T24-2013)

As installed:

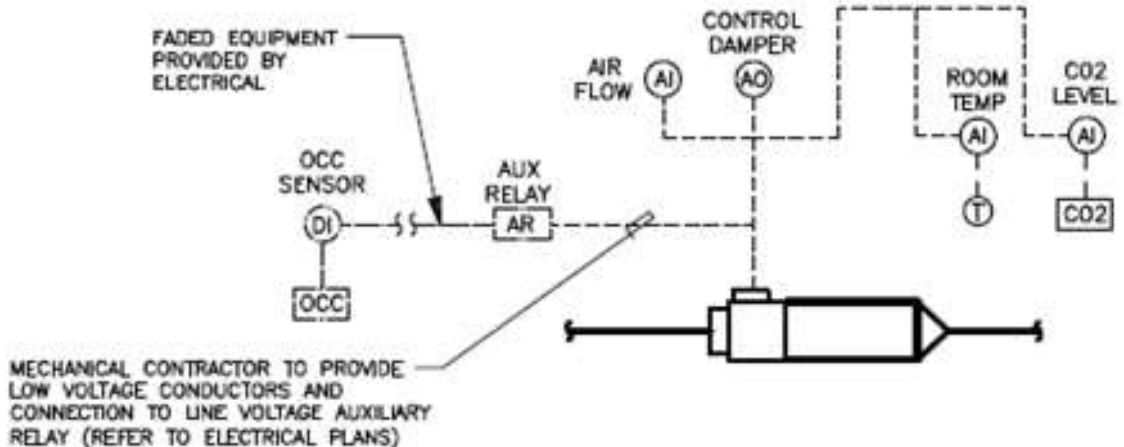
- No integration
- 20 minute timeout

Results:

- Cx Functional Testing: FAIL
- Acceptance Testing: PASS

Example

AT ≠ FPT



Roles

Roles

Commissioning Provider (CxP)

- *When? Pre-design through post-occupancy*
- *Scope:*
 - *Review & verification*
 - *MEP + irrigation, envelope, security, fire alarm, metering...*
- *Avoid: Commissioning Agent/Authority*

Acceptance Test Technician (ATT)

- *When: *after* startup*
- *Scope: HVAC & Lighting Control Systems*

Startup Technician

- *When: Equipment placement through functional testing*
- *Scope: checkout & programming*

Installer

- *When: construction through equipment placement*
- *Scope: install per plans*

[Read more here](#)

3rd party Cx builds quality

Why?

- *Increases quality*
- *Outside specialist*

LEED

- *>20,000 SF*

T24 §120.8

- *3rd party design review*
 - *>50,000 SF*
 - *Complex mechanical system*
- *Functional testing?*
 - *Anyone can do it!*

Lighting Controls for a recent project

- *“Passed” acceptance testing*
- *Failed 2 rounds of functional tests*

THE
FUTURE

Call to Action

Define certified commissioning providers

- *“The individual must be certified by an ANSI/ISO/IEC 17024:2012 accredited organization.”*

Allow Cx providers to do the work

- *Section 10-103(a)1, second paragraph*
- *Add ANSI-certified commissioning professional*

Third party requirement

- *120.8(g)*
- *>50,000 SF, or*
- *Complicated mechanical or lighting control systems, or*
- *Integrated systems*

True functional testing, NOT acceptance testing

[Read more here](#)

Recommended Changes

Thank you!!

Lyn Gomes, PE, CCP, LC, LEED AP
DPR Construction
lyng@dpr.com