



2022 Energy Code –Acceptance Testing Overview

California Energy Commission, Outreach & Education

Allen Wong



Agenda

- 2022 Energy Code Basics
- Acceptance Testing General Information
- Mechanical Acceptance Testing Requirements
- Lighting Acceptance Testing Requirements
- Covered Processes Acceptance Testing Requirements
- Site-Built Fenestration Acceptance Testing Requirements
- Resources



2022 Energy Code Basics



Energy Code History

Warren-Alquist Act established CEC in 1974

- Authority to develop and maintain Building Energy Efficiency Standards (Energy Code)
- Requires CEC to update periodically, usually every 3 years
- Requires Energy Code to be cost-effective over economic life of building

WARREN-ALQUIST ACT

Warren-Alquist
State Energy Resources
Conservation and
Development Act

Public Resources Code
Section 25000 et seq.



CALIFORNIA
ENERGY COMMISSION
Gavin Newsom, Governor

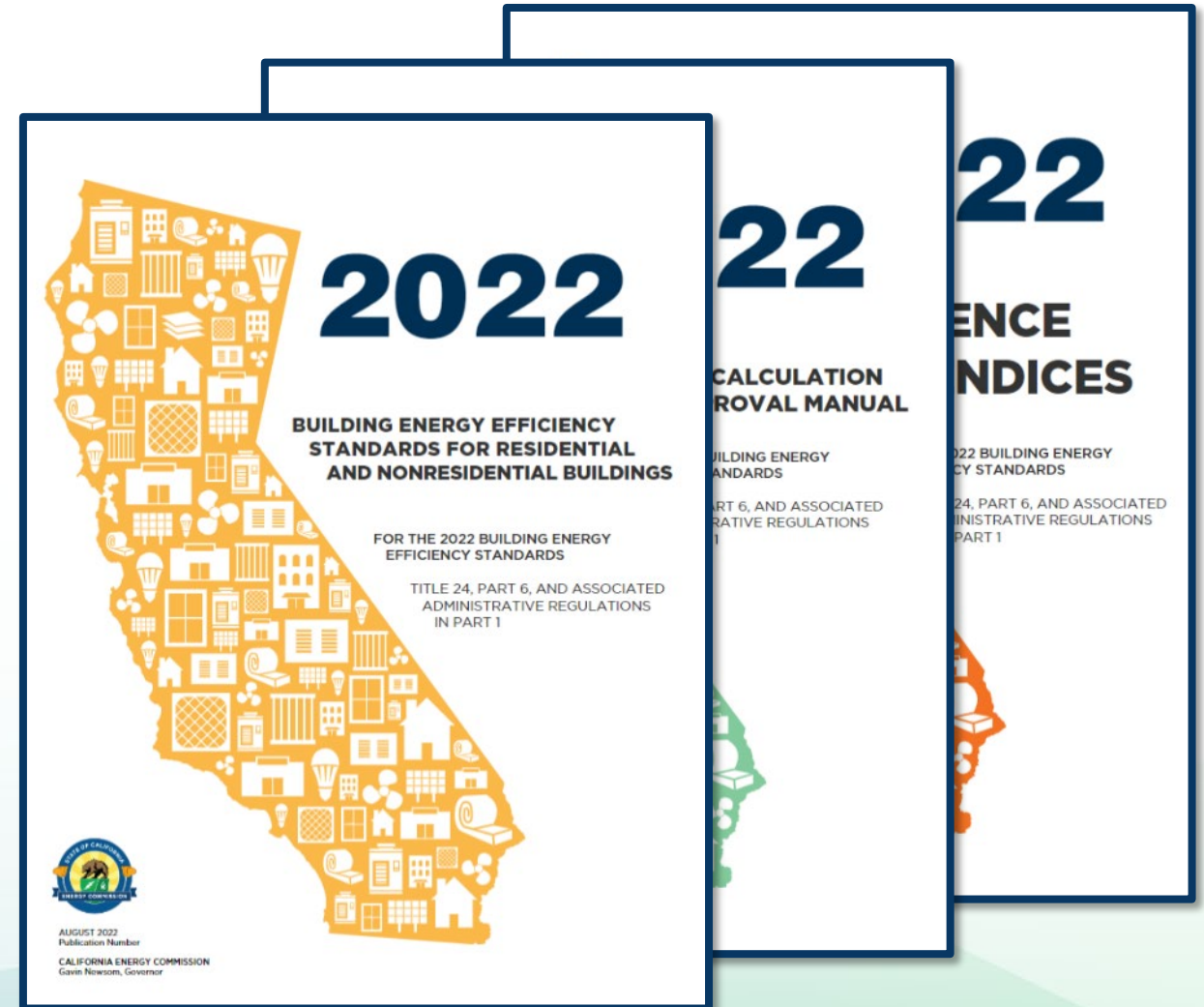
2022 EDITION
JANUARY 2022
CEC-140-2022-001



2022 Energy Code

Effective January 1, 2023

- Building permit applications submitted on or after Jan 1, 2023
- Must use 2022 tools
 - Software
 - Forms





2022 Documents Online

2022 Building Energy Efficiency Standards

The Building Energy Efficiency Standards (Energy Code) apply to newly constructed buildings, additions, and alterations. They are a vital pillar of California's climate action plan. The 2022 Energy Code will produce benefits to support the state's public health, climate, and clean energy goals.

The California Energy Commission (CEC) updates the Energy Code every three years. On August 11, 2021, the CEC adopted the 2022 Energy Code. In December, it was approved by the California Building Standards Commission for inclusion into the California Building Standards Code. The 2022 Energy Code encourages efficient electric heat pumps, establishes electric-ready requirements for new homes, expands solar photovoltaic and battery storage standards, strengthens ventilation standards, and more. Buildings whose permit applications are applied for on or after January 1, 2023, must comply with the 2022 Energy Code.

2022 Energy Code for Residential and Nonresidential Buildings

[2022 ENERGY CODE](#)



Expand All

[Supporting Documents – Appendices, Compliance Manuals, and Forms](#)

[Software – Compliance Software, Manuals, and Tools](#)

BUILDING ENERGY EFFICIENCY STANDARDS - TITLE 24

2025 Building Energy Efficiency Standards

2022 Building Energy Efficiency Standards

— Workshops, Notices, and Documents

2019 Building Energy Efficiency Standards

2016 Building Energy Efficiency Standards

Past Building Energy Efficiency Standards

Climate Zone tool, maps, and information supporting the California Energy Code

Online Resource Center

Solar Assessment Tools

RELATED LINKS

Workshops, Notices, and Documents

CONTACT

[Building Energy Efficiency Standards - Title 24](#)

Toll-free in California: 800-772-3300
Outside California: 916-654-5106

SUBSCRIBE

Building Energy Efficiency Standards

Email *

SUBSCRIBE

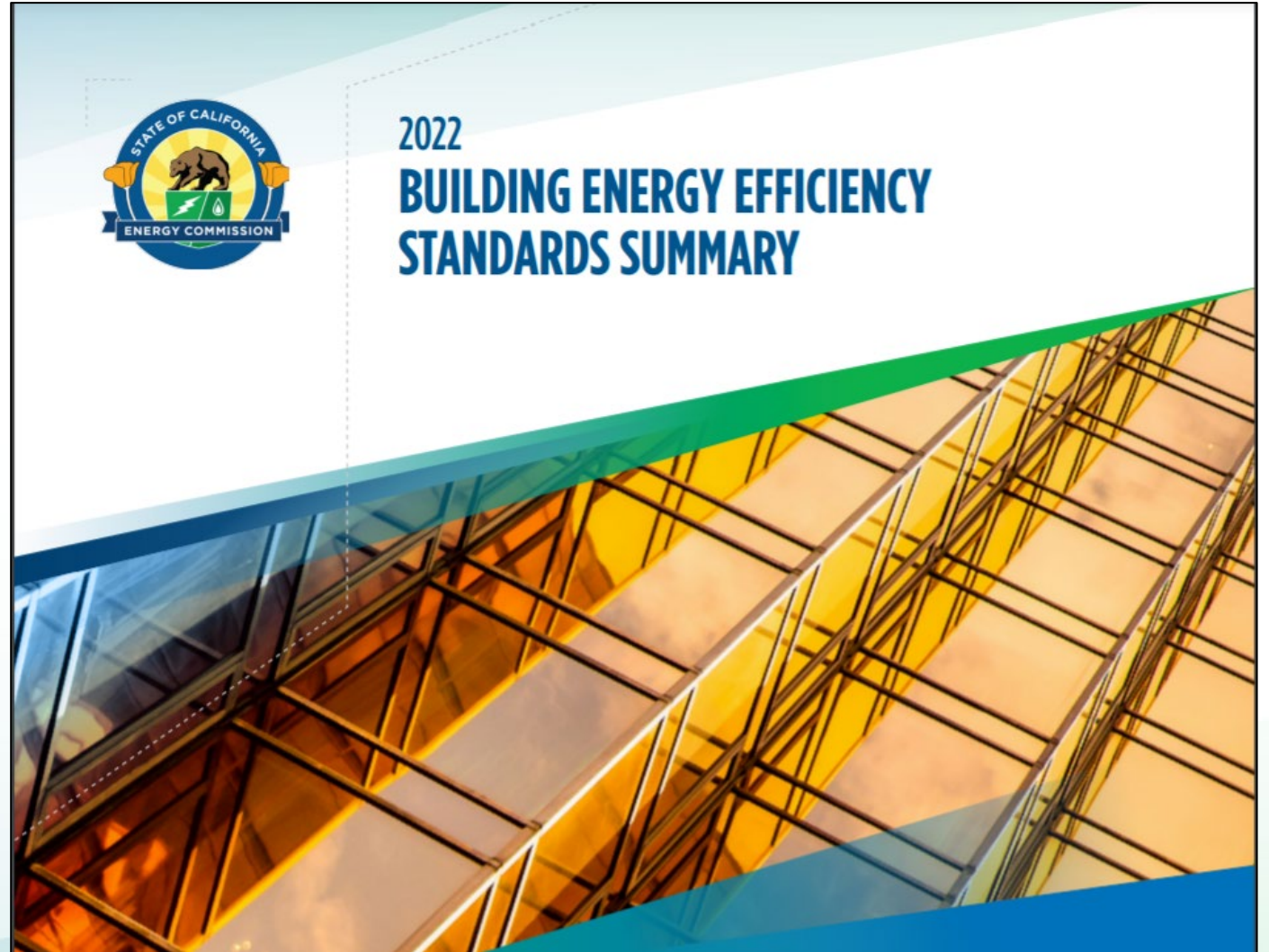
- Energy Code
- Reference Appendices
- Compliance Manuals
- Software
- Forms





2022 Energy Code Highlights

- Heat pump baselines
- Solar and battery storage
- Ventilation
- Lighting
- Multifamily restructuring





Energy Code Requirements

Mandatory requirements

- Minimum efficiency requirements must always be met
- Can never trade off

Prescriptive requirements

- Predefined efficiency requirements
- May supersede mandatory requirements
- Different requirements for newly constructed buildings, additions, and alterations



Demonstrating Compliance

Compliance forms confirm Energy Code is met

Updated for 2022

- Completed by responsible party
 - Designers, consultants, builders, contractors, technicians, HERS raters, ATTs, etc.
- Submitted to enforcement agencies for verification

Type of form	Single-family	Multifamily 3 or less habitable stories	Nonresidential Multifamily 4 or more habitable stories
Certificate of compliance	CF1R	LMCC	NRCC
Certificate of installation	CF2R	LMCI	NRCI
Certificate of verification	CF3R	LMCV	NRCV
Certificate of acceptance	-	NRCA	NRCA



Forms Registration and Certification

All Buildings § 10-103

Updated for 2022

Multifamily buildings 3 or less habitable stories

- When HERS verification is required, all LMCC, LMCI, and LMCV forms must be registered with HERS provider data registry
- When lighting or mechanical acceptance testing is required, all LMCC, LMCI, and NRCA forms must be recorded with ATTCP

Multifamily buildings 4 or more habitable stories

- NRCV must be registered with HERS provider when required
- When lighting or mechanical acceptance test is required, all NRCC, NRCI, and NRCA forms must be recorded with ATTCP



Acceptance Testing General Information



Acronyms Used

- ATTCP - Acceptance Test Technician Certification Provider
- ATT - Acceptance Test Technician
- ATE - Acceptance Test Employer
- AHJ - Authority Having Jurisdiction
- CEC - California Energy Commission
- NRCC - Nonresidential Certificate of Compliance
- NRCI - Nonresidential Certificate of Installation
- NRCA - Nonresidential Certificate of Acceptance
- LMCC - Low-rise Multifamily Certificate of Compliance
- LMCI - Low-rise Multifamily Certificate of Installation
- HERS - Home Energy Rating System



What is Acceptance Testing?

- Introduced in the 2005 Energy Code
- Only for Nonresidential and Common Use Areas in Multifamily Buildings
- Tests performed to ensure that equipment, systems and controls operate as required by the code
 - Visual inspection
 - Confirmation of certification requirements
 - Functional testing



When is Acceptance Testing Required?

- All tests are mandatory requirements
- Specified on NRCC at permit, results reported on NRCA at Final Inspection
- Apply to newly installed and retrofit:
 - HVAC systems and controls
 - Indoor/Outdoor lighting systems and controls
 - Site-built fenestration
 - Covered Processes (e.g., commercial kitchens, commercial refrigeration, computer rooms, controlled environment horticulture, refrigerated warehouses)



Construction Process

1. Pre-application: securing project site, designs, zoning, compliance documents
2. Permit application – submit NRCC or LMCC form(s) to AHJ for approval
 - Forms list required acceptance tests
3. Permit approved; construction begins
 - Installers complete NRCIs/LMCIs; must match NRCC(s)/LMCC(s), or may require re-submittal & re-approval
 - Acceptance testing generally last stage of equipment install
 - AHJ can require testing to be done in front of inspector
 - Regular inspections
4. Final inspection & occupancy permit by AHJ
 - NRCAs submitted to AHJ



Who Can Perform Acceptance Testing?

Acceptance testing can be done by installer or third-party technician

- Certified acceptance test technician (ATT) must do acceptance tests for lighting controls and HVAC
 - Must be certified by CEC-approved ATT certification provider (ATTCP)
 - Certified lighting controls ATT (CLCATT) requirement enforced since July 2014
 - Certified mechanical ATT (CMATT) requirement enforced since October 2021
- Covered processes and site-built fenestration do not require certified ATTs



Who/What is an ATTCP?

- Acceptance Test Technician Certification Provider
 - §§10-103.1 & 10-103.2
 - Approved by the CEC
- Responsible for:
 - Training & certifying acceptance test technicians and acceptance test employers (ATEs) (lighting controls & HVAC only)
 - Quality assurance checks
 - Administering complaints processes



Acceptance Testing Enforcement

1. ATT performs & documents tests; submits results to ATTCP
 - AHJ inspector can also require directly witnessing tests
2. ATT submits validated NRCAs to AHJ
 - Inspector only needs to verify validated NRCAs
3. ATTCP does QA; if tests pass checks, authenticated validated NRCA(s) provided to ATT
 - Checks can include desk or onsite audits
 - Valid NRCAs should have ATTCP seal watermark



Mechanical Acceptance Testing Requirements



Mechanical Acceptance Testing, §§120.5 & 160.3(d)

- Must be performed by certified mechanical ATT (CMATT)
- 21 NRCA-MCH-A forms –19 for nonresidential, 2 for high-rise multifamily dwellings
- Healthcare facilities exempt from acceptance testing



NRCA-MCH Forms (1 of 5)

NRCA-MCH	Nonresidential Appendix NA	Code Sections	System Type	Tests For:
02-A	7.5.1.1 7.5.1.2	120.5(a)1 160.3(d)1A	Outdoor Air	AHUs providing adequate outdoor air
03-A	7.5.2	120.1(c)2 120.2, 120.5(a)2 160.3(d)1B	Constant Volume single-zone (CVSZ) AC & Heat Pumps	Thermostat, supply fan, heating, cooling, damper operation
04-A	7.5.3	120.5(a)3 120.4(g) 141.0(b)2Dii 160.3(d)1C	Duct Leakage, CVSZ	Duct material, installation, insulation
05-A	7.5.4	120.5(a)4 140.4(e)	Economizer DOAS, HRV/ERV	Newly installed HVAC uses outdoor air for space cooling
06-A	7.5.5	120.1(c)4 120.5(a)5	Demand Control Vent.	Vent rates vary per CO2 concentraion



NRCA-MCH Forms (2 of 5)

NRCA-MCH	Nonresidential Appendix NA	Code Sections	System Type	Tests For:
07-A	7.5.6	120.5(a)6 140.4(c)2B&C	Supply Fan Variable Controls	Variable air volume (VAV) boxes modulate; central AHU airflow varies to maintain airflow through VAV boxes
08-A	7.5.7	120.5(a)8 140.4(k)1,5,6	Valve Leakage Test	Control valves designed to withstand pump pressure
09-A	7.5.8	120.5(a)9 140.4(k)4	Water Temp Reset	Chilled/water supply temp auto-reset per building loads or outdoor air temperature
10-A	7.5.9	120.5(a)7 140.4(k)1,5,6	Hydronic System Variable Flow Control	Pump speed & flow controlled per differential pressure; pump motor demand limited
11-A	7.5.10	110.12(b) 120.5(a)10	Auto Demand Shed Controls	HVAC control able to respond to DR signals
12-A	7.5.11	120.2(i) 120.5(a)11	Fault Detection & Diagnostics (FDD) for Packaged Units	FDD systems identify and diagnose common problems (e.g., temp sensor fault, low airflow, faulty economizer)
13-A	7.5.12	120.5(a)12	FDD for air handler (AHU) & Zone Terminals	FDD detects common faults in AHUs and terminal units



NRCA-MCH Forms (3 of 5)

NRCA-MCH	Nonresidential Appendix NA	Code Sections	System Type	Tests For:
14-A	7.5.13	120.5(a)13	Distributed Energy Storage, Direct Expansion (DX) AC Systems	Proper operation of distributed energy storage DX systems
15-A	7.5.14	120.5(a)14	Thermal Energy Storage	System can charge storage tank in off-peak hours and discharge in peak hours.
16-A	7.5.15	140.4(f) 120.5(a)15	Supply Air Temp/ Reset Controls	Supply air temp modulates to meet loads
17-A	7.5.16	120.5(a)16	Condenser Water Temp Reset Controls	Condenser water temp auto-resets per control sequences
18-A	7.7.2	110.2(e), 120.2(h) 120.5(a)17, 130.4(b) 130.5(f), 150.0(k)	Energy Management Control System (EMCS)	EMCS properly installed, operational, and meets requirements



NRCA-MCH Forms (4 of 5)

NRCA-MCH	Nonresidential Appendix NA	Code Sections	System Type	Tests For:
19-A	7.5.17	120.2(e)3 120.5(a)18	Occupied Standby	Occupancy sensor functional and meets approved designs
20-A	7.18.1.1.1 2.2.2.1 2.2.3 7.18.1.1.1 2.2.4.1.3 2.2.4.1.4 2.2.4.1.1 7.18.1.1.2 2.2.4.1.5	160.2(b)2Aivb, v, vi, ix 160.2(b)2Bii, iii 160.2(c)3Biva3 170.2(c)3Biva3	MF Dwelling Inspection, Kitchen Exhaust, IAQ, HRV/ERV	Continuous vent., kitchen exhaust, and/or HRV/ ERV meet Energy Code, ANSI/ ASHRAE 62.2-2016
21-A	7.18.2.1 2.3.2 RESNET 380	120.1(b)2Aivb2	MF Dwelling Env. Leakage	Dwelling unit envelope leakage



NRCA-MCH Forms (5 of 5)


NRCA-MCH	Nonresidential Appendix NA	Code Sections	System Type	Tests For:
22-A	7.18.4.1 7.18.4.2 7.5.4.2	160.2(b)2Av Table 170.2-G	MF Central Vent. Duct Leakage	New vent. ducting serving multiple dwellings
23-A	7.18.4.1 7.18.4.2 7.5.4.2	160.2(b)2Av Table 170.2-G	HRV/ERV Verification	Verify central ERV/HRV serving multiple dwelling units



Mechanical Acceptance Testing and the Plans Examiner

- Verify all HVAC systems/controls and required acceptance tests on applicable NRCC/LMCC
 - -MCH-E, Table O
 - -PRF-01
- Specified forms must be incorporated onto plans

CERTIFICATE OF COMPLIANCE - NONRESIDENTIAL PERFORMANCE COMPLIANCE METHOD		NRCC-PRF-E
Nonresidential Performance Compliance Method		(Page 22 of 23)
M. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE		
Selections made by Documentation Author indicate which Certificates of Acceptance must be submitted for the features to be recognized for compliance. These documents must be provided to the building inspector during construction and must be completed through an Acceptance Test Technician Certification Provider (ATTCP).		
Building Component	Form/Title	
Indoor Lighting	NRCA-LTI-03-A - Automatic Daylight Controls.	
Indoor Lighting	NRCA-LTI-04-A - Demand Responsive Lighting Controls.	
Mechanical	NRCA-MCH-02-A - Outdoor Air must be submitted for all newly installed HVAC units. Note: MCH-02-A can be performed in conjunction with MCH-07-A Supply Fan VFD Acceptance (if applicable) since testing activities overlap	
Mechanical	NRCA-MCH-05-A - Air Economizer Controls	
Mechanical	NRCA-MCH-08-A Valve Leakage Test	
Mechanical	NRCA-MCH-10-A Hydronic System Variable Flow Controls	
Mechanical	NRCA-MCH-11-A Automatic Demand Shed Controls	
Mechanical	NRCA-MCH-12-A FDD for Packaged Direct Expansion Units	
Mechanical	NRCA-MCH-13-A Automatic FDD for Air Handling Units and Zone Terminal Units Acceptance	
Mechanical	NRCA-MCH-16-A Supply Air Temperature Reset Controls	
Mechanical	NRCA-MCH-17-A Condenser Water Temperature Reset Controls	
Mechanical	NRCA-MCH-18-A Energy Management Control Systems	



CALIFORNIA ENERGY COMMISSION

MECHANICAL SYSTEMS

2022-CEC-LMCC-MCH-01-E

O. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE

Table O shows the Certificates of Acceptance that must be completed by an Acceptance Test Technician (ATT) with a valid and current certification from an Energy Commission approved Acceptance Test Technician Certification Provider (ATTCP). The determination of requiring each certificate is included in Table O. The number of required tests must be set to zero (for none) or any whole number. The Name/Tag of the installation to be tested must also be identified, matching the number of tests required. For example, if three NRCA-MCH-04-A duct tests are required, then the table must list three installation name/tags.

Table O: Required Certificates of Acceptance

Field	Certificate of Installation	Trigger	No. Req.	List each Name/Tag Triggering the Certificate	AHJ Field Inspector
01	NRCA-MCH-02-A Outdoor Air	Required if Table B, Field 16 is selected			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
02	NRCA-MCH-03-A Constant Volume	Required if Constant Volume Single Zone HVAC Systems are included in the scope			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
03	NRCA-MCH-04-A Air Distribution	Required if Table B, Field 16 is selected and			<input type="checkbox"/> Pass <input type="checkbox"/> Fail



Mechanical Acceptance Testing and the Field Inspector

- At final inspection, verify required NRCA forms
 - Refer to NRCC or LMCC form
- Verify Acceptance testing is performed by CMATT, when required
 - NRCA forms must have proper ATTCP logo
- Commonly required NRCA forms
 - Outdoor air (MCH-02)
 - Constant-volume single zone HVAC (MCH-03)
 - Duct leakage (MCH-04)
 - Economizer controls (MCH-05)
 - Demand Control Vent. (MCH-06)





Lighting Acceptance Testing Requirements



Lighting Controls Acceptance Testing, §§130.4 & 160.5(e)

- Must be performed by certified lighting controls ATT (CLCATT)
- Only for nonresidential spaces and MF common use areas
- Also required for demand response controls for receptacles (§§130.5(d) & 110.12(e))
- Does not apply to healthcare facilities



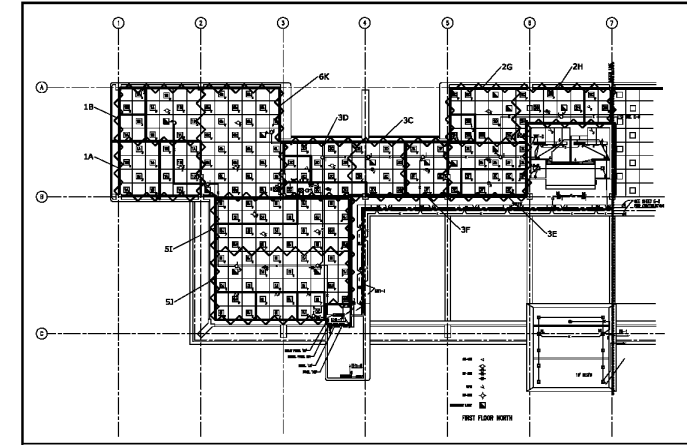
NRCA-LTI & -LTO Forms

NRCA-	NA	Code Sections	System Type	Tests For:
LTI-02-A	7.6.2	110.9(b) 130.1(c) 160.5(b)4C	Automatic Shutoff Controls	Occupant sensors installed per manufacturer instructions, adjust lights per occupancy; auto timers turns lighting on/off per programmed schedule, manual override turns lighting on during scheduled off periods.
LTI-03-A	7.6.1	130.1(d) 160.5(b)4D	Automatic Daylighting Controls	Controls installed and auto adjust lighting power per available daylighting
LTI-04-A	7.6.3 7.6.5	110.12(c)&(e)	Demand Responsive Lighting & Controlled Receptacles	During demand response event: controls can reduce building lighting power to at least 85%, produces uniform level of illumination; shut off controlled receptacle loads
LTI-05-A	7.6.4	140.6(a)2J 170.2(e)Bx	Institutional Tuning Power Adjustment Factor (PAF)	Control limits maximum light output or power draw to 85% or less
LTO-02-A	7.8	110.9(b) 130.2(c) 160.5(c)2	Outdoor Lighting	All outdoor lighting under §§130.2(c) & 160.5(c) controlled by motion sensor, photocontrol, astronomical timer, and auto scheduling control, as required




Lighting Controls Acceptance Testing and the Plans Examiner

- Verify lighting controls on electrical plans:
 - Daylit zones
 - Many spaces require occupant sensors and automatic shutoff controls
 - Demand response controls, if 4,000W or more requires multilevel controls
 - Outdoor photocontrol & auto-scheduling controls required for most areas
 - Outdoor motion sensors
- Verify req. acceptance tests on NRCC/LMCC
- -LTI-E, Table V
 - -LTO-E, Table P
 - -PRF-01
- Forms must be incorporated onto plans



CERTIFICATE OF COMPLIANCE - NONRESIDENTIAL PERFORMANCE COMPLIANCE METHOD		NRCC-PRF-E
Nonresidential Performance Compliance Method		(Page 22 of 23)
M. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE		
Selections made by Documentation Author indicate which Certificates of Acceptance must be submitted for the features to be recognized for compliance. These documents must be provided to the building inspector during construction and must be completed through an Acceptance Test Technician Certification Provider (ATTCP).		
Building Component	Form/Title	
Indoor Lighting	NRCA-LTI-03-A - Automatic Daylight Controls.	
Indoor Lighting	NRCA-LTI-04-A - Demand Responsive Lighting Controls.	



CALIFORNIA ENERGY COMMISSION

CEC-NRCC-LTI-E

V. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE

Selections have been made based on information provided in this document. If any selections have been changed by the permit applicant, an explanation should be included in Table E. Additional Remarks. These documents must be provided to the building inspector during construction and any with "-A" in the form name must be completed through an Acceptance Test Technician Certification Provider (ATTCP).

Yes	No	Form/Title	Field Inspector	
			Pass	Fail
<input checked="" type="radio"/>	<input type="radio"/>	NRCA-LTI-02-A - Must be submitted for occupancy sensors and automatic time switch controls.	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="radio"/>	<input type="radio"/>	NRCA-LTI-03-A - Must be submitted for automatic daylight controls.	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="radio"/>	<input type="radio"/>	NRCA-LTI-04-A - Must be submitted for demand responsive lighting controls.	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="radio"/>	<input type="radio"/>	NRCA-LTI-05-A - Must be submitted for institutional tuning power adjustment factor (PAF).	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="radio"/>	<input type="radio"/>	NRCA-ENV-03-F - Must be submitted for daylighting design power adjustment factors (PAF).	<input type="checkbox"/>	<input type="checkbox"/>



Lighting Controls Acceptance Testing and the Field Inspector

- Verify required NRCI / LMCI-LTI & -LTO forms
- Verify required NRCA-LTI & -LTO forms signed by CLCATT & possessing ATTCP logo





Covered Processes Acceptance Testing Requirements



Covered Processes, §§120.6, 160.2, 160.7

System Type	NA	Applicable Areas	Tests For:
Refrigerated Warehouses §120.6(a)7	7.10	Refrigerated warehouses $\geq 3,000$ ft ² ; refrigerated spaces with total of $\geq 3,000$ ft ² served by same refrigeration system	Underslab heating; evaporators; condensers; variable speed screw compressors
Commercial Refrigeration §120.6(b)6	7.20	Retail food stores with CFA $\geq 8,000$ ft ² that have refrigeration	Coolers
Enclosed Parking Garages §120.6(c)8, §160.2(d)	7.12	Garages with total design exhaust rate $\geq 10,000$ CFM	Ventilation
Compressed Air Systems §120.6(e)6	7.13	Compressors with total combined HP ≥ 25	Compressors & controls
Elevators §120.6(f)5, §160.7(a)	7.14	All elevators	Cab lighting and ventilation controls
Escalators & Moving Walkways §120.6(g)2	7.15	Escalators and moving walkways in airports, hotels, and transport function areas	Speed control
Steam Traps §120.6(i)4	7.19	New steam traps in industrial facilities with steam trap operating pressure >15 psig and total combined connected boiler input > 5 MMBtu/hr	Fault detection



Covered Processes, §140.9

System Type	NA	Applicable Areas	Acceptance Tests For:
Commercial Kitchen Exhaust §140.9(b)3	7.11	New commercial kitchens, or new commercial kitchen exhaust systems with Type I & II kitchen hood exhausts with a total exhaust airflow rate > 5,000 cfm	Exhaust airflow, DCV, makeup air
Laboratory and Factory Exhaust §140.9(c)3Cv	7.16	Newly installed fan exhaust systems serving a lab or factory > 10,000 cfm	Wind speed/direction control, contaminant control
Fume Hood Automatic Sash Closure §140.9(c)4B	7.17	VAV lab fume hoods with vertical-only sashes fume hood intensive laboratories	Manual & automated controls of fume hood and sash

- Prescriptive; can be traded off in the performance approach
- Healthcare facilities exempt from §140.9(b)&(c)



Covered Processes and the Plans Examiner

T. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE

Selections have been made based on information provided in this document. If any selections have been changed by the permit applicant, an explanation should be included in Table E. Additional Remarks. These documents must be provided to the building inspector during construction and must be completed through an **Acceptance** Test Technician Certification Provider (ATTCP).

YES	NO	Form/Title	Field Inspector	
			Pass	Fail
<input type="radio"/>	<input type="radio"/>	NRCA-PRC-01-F Compressed Air Systems	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input type="radio"/>	NRCA-PRC-02-F Kitchen Exhaust	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input type="radio"/>	NRCA-PRC-03-F Garage Exhaust	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input type="radio"/>	NRCA-PRC-04-F Refrigerated Warehouses - Evaporator Fan Motor Controls	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input type="radio"/>	NRCA-PRC-05-F Refrigerated Warehouses - Evaporative Condenser Controls	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input type="radio"/>	NRCA-PRC-06-F Refrigerated Warehouses - Air Cooled Condenser Controls	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input type="radio"/>	NRCA-PRC-16-F Refrigerated Warehouses - Adiabatic Condenser Controls	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input type="radio"/>	NRCA-PRC-07-F Refrigerated Warehouses - Variable Speed Compressor	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input type="radio"/>	NRCA-PRC-08-F Refrigerated Warehouses - Electric Resistance Underslab Heating System	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input type="radio"/>	NRCA-PRC-12-F Elevator Lighting & Ventilation Controls	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input type="radio"/>	NRCA-PRC-13-F Escalators & Moving Walkways Speed Controls	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input type="radio"/>	NRCA-PRC-14-F Lab Exhaust Ventilation Systems	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input type="radio"/>	NRCA-PRC-15-F Fume Hood Automatic Sash Closure Systems	<input type="checkbox"/>	<input type="checkbox"/>

- Verify NRCC/LMCC on plans

- -PRC-E, Table T

- -PRF-01-E

- Verify required Acceptance

Tests on NRCC forms above

CERTIFICATE OF COMPLIANCE - NONRESIDENTIAL PERFORMANCE COMPLIANCE METHOD		NRCC-PRF-E
Nonresidential Performance Compliance Method		(Page 17 of 18)
M. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE		
Selections made by Documentation Author indicate which Certificates of Acceptance must be submitted for the features to be recognized for compliance. These documents must be provided to the building inspector during construction and must be completed through an Acceptance Test Technician Certification Provider (ATTCP).		
Building Component	Form/Title	
Indoor Lighting	NRCA-LTI-03-A - Automatic Daylight Controls.	
Indoor Lighting	NRCA-LTI-04-A - Demand Responsive Lighting Controls.	
Covered Process	NRCA-PRC-03-F Garage Exhaust	



Covered Processes and the Field Inspector

- Verify applicable Certificate of Acceptance at final inspection
 - CMATT not required
 - Refer to NRCC/LMCC-PRC-01 or -PRF-01-E

NRCA-PRC Form(s)	Nonresidential	Multifamily
01-F: Compressed air	X	
02-F: Kitchen exhaust	X	X
03-F: Parking Garage Ventilation	X	X
04-F to 08-F, 16-F, & 17-F: Refrigerated Warehouse	X	
12-F: Elevator Lighting & Vent. Control	X	X
13-F: Escalator Speed Control	X	
14-F: Lab Exhaust	X	
15-F: Fume Hoods	X	



Site-Built Fenestration Acceptance Testing Requirements



Site-Built Fenestration, §110.6(a)6

- Site-built fenestration in nonresidential & multifamily buildings must be certified as meeting NA7.4
 - Site-built fenestration – field-glazed/-assembled units, using specific factory-made framing and glazing units manufactured with the intention of assembly at the construction site
 - Requires matching NFRC label certificate readily accessible at project location
- Exception: Fenestration removed and reinstalled as part of an alteration or addition



§110.6 and the Plans Examiner

YES		NO		Form/Title	System to be Field Verified	Field Inspector	
						Pass	Fail
<input checked="" type="radio"/>	<input type="radio"/>			LMCA-ENV-02-F - Must be submitted for all new, added or altered fenestration.		<input type="checkbox"/>	<input type="checkbox"/>
				LMCA-ENV-03-F - Daylighting design indoor lighting power adjustment factors (PAF). Note: The requirement for this LMCA is indicated on the LMCC-LTI (prescriptive) or LMCC-PRF (performance) because it is only relevant if a PAF is used for clerestories, daylight redirection devices or horizontal slats.			

Indoor Lighting	NRCC-LTI-E - Indoor Lighting (for all buildings)
M. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE Selections made by Documentation Author indicate which Certificates of Acceptance must be submitted for the features to be recognized for compliance. These documents must be provided to the building inspector during construction and must be completed through an Acceptance Test Technician Certification Provider (ATTCP).	
Building Component	Form/Title
Envelope	NRCA-ENV-02-F - NRFC label verification for fenestration
Indoor Lighting	NRCA-LTI-02-A - Occupancy Sensors and Automatic Time Switch Controls.

CA Building Energy Efficiency Standards - 2022 Nonresidential Compliance Report Version: 2022.0.000 Report Generated: 2024-06-26 07:55:18
Schema Version: rev 20220601

- Verify applicable NRCC/LMCC on plans
 - -ENV-E, Table N
 - -PRF-01
- Verify required Acceptance Tests on NRCC(s) and respective forms above



§110.6 and the Field Inspector

- Verify applicable Certificate of Acceptance at final inspection
 - NRCA-ENV-02-F
 - NRCA-ENV-03-F (Daylighting design indoor lighting PAF)
- Refer to NRCC/LMCC forms



Source: <https://www.graboyes.com/2018/10/energy-performance-of-glass-facade-systems-exceeding-30-to-40-percent-window-to-wall-ratio-with-the-2018-iecc/>



NRCA-ENV Forms

NRCA-	NA	Code Sections	System Type	Tests For:
ENV-02-F	7.4.1 7.4.2 7.4.3	10-111 & 110.6(a)5	Newly installed fenestration, window films, and dynamic glazing	NFRC Label Certificate or CEC Fenestration Certificate provided for each fenestration product installed; thermal performance of installed fenestration must match label certificate, energy compliance documentation, and plans.
ENV-03-F	7.4.4 7.4.5 7.4.6	140.3(d) 170.2(e)2xii	Clerestory windows, horizontal slats, and light shelves	Clerestory windows, horizontal slats, and light shelves meet daylighting design requirements to claim a power adjustment factor (PAF) for lighting systems



In Summary

- Acceptance testing required for HVAC, indoor/outdoor lighting, site-built fenestration, and covered processes
- When applicable, acceptance tests must be specified on respective NRCC form at permit
 - Results reported on respective NRCA form at final inspection
 - Field technicians performing testing for lighting controls or HVAC must be a CLCATT or CMATT, respectively.



Resources



Energy Code Support Center

www.energy.ca.gov/energy-code-support-center



Handouts

- Fact sheets
- Guides

Tools

- Checklists
- Blueprint newsletter

Training

- Presentations
- Videos

Links

- Internal resources
- External resources



2022 Energy Code Handouts

- Solar PV and battery online fact sheets
- Covered processes fact sheets
- Envelope fact sheets
- Summary of significant changes
- Summary of mandatory requirements
- Download from the [Energy Code Support Center](#)





ATTCP Program - Lighting

ATTCP Program information

Lighting Controls

- National Lighting Contractors Association of America (NLCAA)
- California Advanced Lighting Controls Training Program (CALCTP)



National Lighting Contractors
Association of America



California Advanced Lighting
Controls Training Program



ATTCP Program - Mechanical

ATTCP Program information

Mechanical Systems

- California State Pipe Trades Council (CSPTC)
- National Energy Management Institute Committee (NEMIC)
- National Environmental Balancing Bureau (NEBB)
- Refrigeration Service Engineers Society (RSES)





Blueprint Newsletter

Energy Code quarterly newsletter

- Updates
- Clarifications
- Frequently asked questions



Issue 138 | April - June 2022

BLUEPRINT

CALIFORNIA ENERGY COMMISSION
EFFICIENCY DIVISION

IN THIS ISSUE

- 2022 Energy Code: Multifamily Summary
- 2022 Energy Code: Compliance Software
- 2019 Energy Code: HERS Verifications
- Q&A
 - Solar PV for Multifamily Buildings
 - Multifamily Water Heating
 - Multifamily Common Use Areas

2022 Energy Code: Multifamily Summary

The 2022 Building Energy Efficiency Standards (Energy Code) reorganizes low-rise (three or fewer habitable stories) and high-rise (four or more habitable stories) multifamily buildings into one building type, updates the multifamily buildings definition in § 100.1, and moves all requirements for multifamily buildings to §§ 160.0-180.4. This and other significant changes include:

Mandatory Requirements

- Updates minimum efficiencies for HVAC equipment; adds minimum efficiency requirements for dedicated outdoor air systems (DOAS), heat pump, and heat recovery chiller packages. § 110.2
- Changes demand responsive lighting controls trigger to 4,000 watts or more; adds requirements for controlled receptacles. §§ 110.12, 160.5(b)4E

- Unifies envelope insulation, vapor retarder, and fenestration requirements. § 160.1
- For dwelling units
 - Adds requirements for central fan integrated ventilation systems requiring a motorized controlled damper, damper controls, and variable ventilation. § 160.2(b)2Aii
 - Requires vented kitchen range hoods ventilation rates or capture efficiencies based on conditioned floor area and fuel type per Tables 160.2-E, F, G. § 160.2(b)2Avic2
 - Requires a HERS-verified maximum fan efficacy of 1.0 Watts per cfm for heat recovery ventilation (HRV) and energy recovery ventilation (ERV) systems. § 160.2(b)2Biii
 - Adds mechanical acceptance testing requirements. § 160.3(d)2
 - Adds electric-ready requirements when gas equipment is installed for space heating, cooking, and clothes dryers. § 160.9(a-c)

For additional help with the Energy Code see Energy Code Ace's **online offerings** of trainings, tools, and resources.



Stay Connected

Receive Energy Code updates

- [Subscribe to Efficiency Division emails](#)
 - Appliances
 - Blueprint
 - Building Standards
- Respond to confirmation email

Follow the California Energy Commission





Energy Code Hotline

Energy Code Hotline Submission Form

Please submit your Energy Code questions through the Energy Code Inquiry Submission Form.

Contact and General Information

What is your name? [?] *

What is your email address? [?] *

What is your question about? [?] *

What is your role? [?]

Building and Project Information

What is the building type? [?] *

What is project type/scope of the building? [?] *

Is the building conditioned (heating and/or cooling) or unconditioned (no heating or cooling)? [?] *

Please list the climate zone of the project. Alternatively, please enter the address of the project. [?] *

Monday through Friday

- 8:00 a.m. to 12:00 p.m.
- 1:00 p.m. to 4:30 p.m.

Call

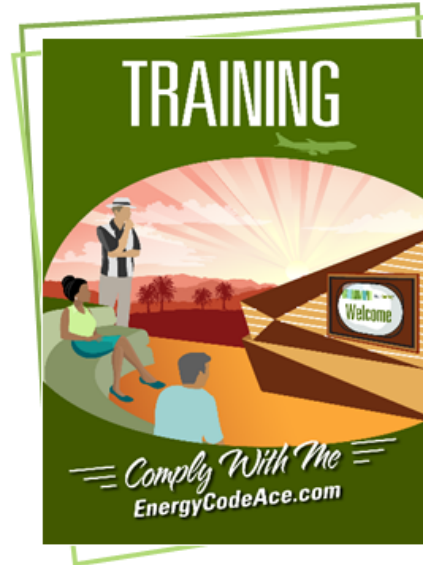
- 800-772-3300 in CA
- 916-654-5106 outside CA

Contact

- [Hotline Submission Form](#)



Energy Code Ace



Tools help automate tasks:

- ✦ Energy Code Product Finder
- ✦ Forms Ace
- ✦ Image Ace
- ✦ Navigator Ace
- ✦ Nonres. Indoor Lighting Wheel
- ✦ Q&Ace
- ✦ Reference Ace
- ✦ Timeline Ace
- ✦ Virtual Compliance Assistant

Training is activity based and delivered in a variety of formats:

- ✦ Live Online instructor-led
- ✦ Recorded webinars
- ✦ Online self-study
- ✦ YouTube — live streaming & videos


Resources provide quick, useful guidance:

- ✦ Fact Sheets
- ✦ Checklists
- ✦ Application Guides
- ✦ Submit a Question
- ✦ Trigger Sheets
- ✦ Useful Links

Join us at EnergyCodeAce.com



Local RENs




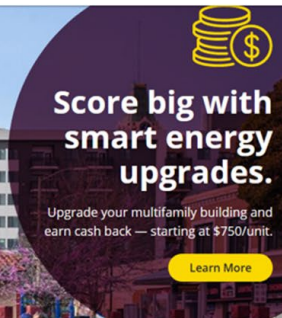
Local Government Engineering for Sustainability


[» HOW TO GET STARTED](#) [» FIND A CONTRACTOR](#) [» FIND AN ASSESSOR](#) [» PARTNER WITH US](#)


[REBATES & FINANCING](#)
[HOME LEARNING CENTER](#)
[EVENTS & TRAINING](#)
[LOCAL GOVERNMENT RESOURCES](#)
[ABOUT](#)

[f](#) [in](#) [t](#) [@](#) [v](#)











INLAND REGIONAL ENERGY NETWORK


[ABOUT](#) [PROGRAMS](#) [EVENTS / CALENDAR](#) [CONTACT US](#)



Public Sector Program




Workforce Education & Training Program




Codes & Standards Program

INLAND REGIONAL ENERGY NETWORK


The Inland Regional Energy Network (I-REN) connects local governments, the workforce, and other stakeholders to a wide range of energy efficiency resources.



[ABOUT 3C-REN](#) [HOME ENERGY SAVINGS](#) [BUILDING PERFORMANCE TRAINING](#) [ENERGY CODE CONNECT](#)




3C-REN (Tri-County Regional Energy Network) reduces energy use in our region's buildings for a more affordable, healthy, resilient and sustainable community.



HOME ENERGY SAVINGS

Save energy and improve your property


[Start Saving Today!](#)



BUILDING PERFORMANCE TRAINING

Develop your skills in building performance


[Find a Course](#)



ENERGY CODE CONNECT

Personalized coaching and educational events to simplify the energy code

[Submit Your Inquiry](#)



[Public Agencies](#) [Residential](#) [Financing](#) [WE&T](#) [About SoCalREN](#)

LIMITED TIME ONLY: SoCalREN can cover up to 80% - 100% of heat pump water heater installation costs for projects completed this year! [Learn More](#)




SoCalREN Empowering Sustainable Communities


Celebrating 10 Years of SoCalREN empowering sustainable communities by creating pathways toward a greener future. [Learn More](#)

SoCalREN Programs

Whether you're a homeowner, multifamily property owner or manager, business owner, or public agency representative, the Southern California Regional Energy Network (SoCalREN), a service of the County of Los Angeles, can help you take advantage of a wide variety of energy efficiency opportunities that can help you save energy and money. Learn more by visiting the program of your choice below, and feel free to [contact us](#) with any questions.











New Resource Hub

Homeowners and renters

- Information about water and space heating, cooking, EV charging, incentives

Contractors

- Information about training, tools, incentives

Local government representatives

- Information about model policies, permitting, training, incentives

Links on the [Building and Home Energy Resource Hub](#)





Thank You!