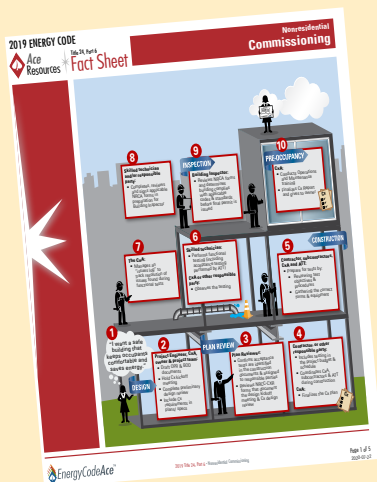


Acceptance Testing vs. Commissioning

It is important to note that acceptance testing does NOT take the place of commissioning or test and balance procedures required elsewhere in the Energy Code or by a building owner. Acceptance testing is required on all nonresidential building projects in California, including all HVAC change-outs. All of the commissioning requirements in Section 120.8 apply to newly constructed buildings containing 10,000 square feet or more of nonresidential conditioned space, with the exception of healthcare facilities which are subject to the applicable acceptance and installation documentation requirements of OSHPD. Acceptance testing is an integral part of commissioning for buildings over 10,000 sf. All equipment to be tested and tests to be performed should be included in the Commissioning Plan, in the schedule and on the construction documents, and should be demonstrated during the Functional Performance Testing stage. The commissioning agent should include results of the acceptance testing in the final commissioning report. For more information see the [Energy Code Ace Fact Sheet on Nonresidential Building Commissioning](#).



What is Acceptance Testing?

First included in California's 2005 Building Energy Efficiency Standards (Energy Code), Title 24, Part 6, acceptance testing specifies targeted inspections and functional performance tests to help ensure that equipment installed in nonresidential buildings is operating as designed and in compliance with the Energy Code. These pass/fail tests are required for lighting controls, mechanical systems and process equipment installed in newly constructed buildings and as part of major renovations, and for all new replacement equipment of these types.

Nonresidential building systems requiring acceptance testing include, but aren't limited to:

- Lighting controls
- HVAC
- Controls
- Air distribution ducts
- Envelope features
- Process equipment

Acceptance testing procedures can be found in [Nonresidential Reference Appendix 7 \(NA7\)](#), including equipment, systems and functions to be tested, conditions under which test is to be performed, and measurable results for acceptable performance.

Why?: Acceptance testing helps ensure that nonresidential buildings in California meet energy efficiency goals.

Relevant Code Sections

2019 California Building Energy Efficiency Standards, Title 24, Part 6:

- [Nonresidential Reference Appendix 7 \(NA7\)](#) – Installation and Acceptance Requirements for Nonresidential Buildings and Covered Processes
- Refer to the [Table 1](#) below

Relevant Compliance Forms

- Refer to the [Table 1](#) below

Roles and Responsibilities: Who Does What and When?

Acceptance testing generally includes three phases:

- Documentation inspection
 - While performing the document inspection, the technician is required to review the construction plans that were approved by the local building department. These plans should include the required Nonresidential Certificates of Compliance (NRCC) and the Nonresidential Certificates of Installation (NRCI)
- Construction inspection
 - The technician then compares the approved plans and documentation to the actual installations and verifies that they are consistent. After all necessary modifications are made, the technician can then proceed with the functional test
- Functional testing
 - The functional test is specific to the equipment type and requirements in the Energy Code. Acceptance testing can be performed by the installing technician or a third party. The acceptance test is intended to give the installing technician a credible document that shows that the installed system was operational and in compliance with the Energy Code when the technician left the construction site

Testing results must be reported to the local building department on the applicable Nonresidential Certificate of Acceptance (NRCA). All performance deficiencies must be corrected by the builder or installing contractor and the acceptance testing procedures must be repeated until the construction/installation of the specified systems conform to the required acceptance criteria. Only then can the final certificate of occupancy be issued.

Acceptance Test Technician Certification Providers (ATTCPs)

The Energy Commission approves [Acceptance Test Technician Certification Providers](#) (ATTCP) that train, certify and oversee acceptance test technicians (ATT) performing acceptance tests for nonresidential buildings. When a certified ATT is required, the enforcement agency must verify the technician's status through the ATTCP before issuing a final certification of occupancy.

Lighting Control Installations

As of July 1, 2014, acceptance testing and documentation for lighting control installations must be performed by a certified ATT.

Duct Sealing

Duct sealing requirements specified in Title 24, Part 6 [Section 140.4\(l\)](#) must be verified by a certified Home Energy Rating System (HERS) Rater per the procedures outlined in the 2019 [Nonresidential Appendix NA1](#) and [Nonresidential Appendix NA2](#).

Envelope Installations

Acceptance testing is usually the responsibility of the installing contractor or other person eligible under Division 3 of the Business and Professions Code to accept responsibility for the applicable scope of system design, construction or installation. While the individual performing the testing need not be licensed, the responsible person who signs the Certificate of Acceptance must be. If more than one person is responsible for acceptance testing, each person must sign and submit the Certificate of Acceptance applicable to the control or system acceptance testing for which he or she is responsible.

HVAC Installations

As of October 1, 2021, acceptance testing and documentation for HVAC installations per [Section 120.5](#) must be performed by a certified ATT.

In addition to the ATT, the following professionals should also be present at the time of HVAC system testing to clarify any issues related to interfaces between systems:

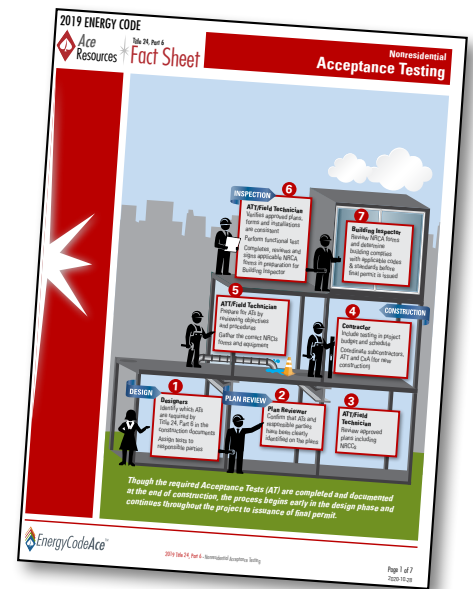
- Testing, Adjusting, Air Balancing (TAB) technician
- Building Automation System (BAS) technician
- HERS rater

Compliance Documents

Understanding which NRCA and NRCI forms are required is important. The newly revised [dynamic pdf versions of the NRCC form](#) auto-populate the NRCA and NRCI forms required for your project, eliminating any guesswork. The [nonresidential compliance documents](#) can be found on the Energy Commission's website. These documents are designed to ensure that the installed energy-efficient equipment is in compliance with the Energy Code and should be passed along with the building's ownership.

Depending on the control or system, an applicable NRCA form outlines the testing criteria to be completed successfully before final Certificate of Occupancy. For example, in order to confirm that ventilation systems provide adequate outside air, the 2016-NRCA-MCH-02-A must be completed. Acceptance testing of controls such as economizer controls and demand control ventilation are documented on [NRCA-MCH-05-A](#) and [NRCA-MCH-06-A](#) respectively.

Table 1 outlines the required compliance forms for each measure requiring acceptance testing. It is important to note that all NRCA-LTI and NRCA-LTO forms **MUST** be registered through the ATTCP. At this time, the [NRCA-MCH-04a-H](#) for duct testing must be registered through the HERS provider. However, there are no registration requirements for other NRCA-MCH forms or for NRCA-ENV forms.



Tip: Forms should be onsite before the technician arrives to perform testing

Table 1: Acceptance Test Forms and Code Sections

Acceptance Tests <i>To be performed after system is installed BUT before final permit</i>	Title 24, Part 6 Section	Nonresidential Appendices Test Method	Required Compliance Forms	Related Compliance Forms	Notes
ENVELOPE					
Envelope Fenestration	§10-111 §110.6	NA7.4.1 NA6.1 (for non-rated site-built fenestration)	NRCA-ENV-02-F	NA	
Power Adjustment Factors (PAF) a. Clerestories b. Interior/ Exterior Horizontal Slats c. Interior/ Exterior Light Shelves	§140.3(d)	NA7.4.4 NA7.4.5 NA7.4.6	NRCA-ENV-03-F	NA	
LIGHTING CONTROLS *All Lighting Acceptance forms must be registered through the ATT provider					
All Lighting Controls newly-installed lighting control systems a. Occupancy Sensors b. Partial-OFF/Partial-ON occupancy sensors c. Automatic Time Switch Controls	§110.9(b) §130.4(a) §130.1(c)	NA7.6.2 NA7.7	NRCA-LTI-02-A	NA	
Automatic Daylighting Controls	§110.9(b) §130.4(a) §130.1(d)	NA7.7.5.1 NA7.6.1	NRCA-LTI-03-A	NA	
Demand Responsive Controls	§110.12 §130.4(a) §130.1(e)	NA7.6.3	NRCA-LTI-04-A	NA	
Institutional Tuning	§130.4(a) §140.6(a)2J	NA7.7.5.2	NRCA-LTI-05-A	NA	
Lighting Alterations	§110.9(b) §130.4(a) §141.0(b)2I	NA7.6 NA7.7	NRCA-LTI-02-A NRCA-LTI-03-A NRCA-LTI-04-A	NA	Acceptance Testing not required for alterations where controls added to ≤ 20 luminaires
Outdoor Lighting Controls a. Motion Sensor b. Photocontrol c. Astronomical Time-switch control d. Part-night outdoor lighting control e. Automatic scheduling control	§110.9(b) §130.4(a) §130.2 (a, c)	NA7.8	NRCA-LTO-02-A	NA	
MECHANICAL *All Mechanical Acceptance forms must be registered through the ATT provider as of October 1, 2021.					
Simple Mechanical Systems					
Constant Volume, Single Zone AC and Heat Pump Controls New duct systems, altered space conditioning system, and/or altered duct system, or if the compliance software requires low leakage air-handling unit verification	§120.5(a)2	NA7.5.2	NRCA-MCH-02-A NRCA-MCH-03-A	MCH-05-A MCH-06-A MCH-12-A	

Acceptance Tests <i>To be performed after system is installed BUT before final permit</i>	Title 24, Part 6 Section	Nonresidential Appendices Test Method	Required Compliance Forms	Related Compliance Forms	Notes
MECHANICAL					
Simple Mechanical Systems <i>Continued</i>					
New Duct Systems Required for single zone units serving < 5,000 ft ² of floor area where >25% of duct surface area is: <ol style="list-style-type: none"> 1. Outdoors 2. In a space directly under a roof where U factor of the roof > U factor of the ceiling 3. In a space directly under a roof with fixed vents or openings to the outside or unconditioned spaces 4. In an unconditioned crawlspace 5. In other unconditioned spaces 	140.4(l)1 140.4(l)2 120.5(a)3	NA7.5.3	NRCA-MCH-04a-H and NRCA-MCH-04b-A *Must be completed by a HERS Rater	NA	HERS verification required
Part of an Existing Duct System <ol style="list-style-type: none"> 1. Existing duct systems that are being extended per §141.0(b)2D 2. Space conditioning systems altered by the installation or replacement of space conditioning equipment per §141.0(b)2E, including replacement of the air handler, outdoor condensing unit of a split system air conditioner or heat pump, cooling or heating coil, or the furnace heat exchanger Existing duct systems do not have to be tested if they are insulated or sealed with asbestos	141.0(b)2D 120.5(a)3	NA2	NRCA-MCH-04a-H and NRCA-MCH-04b-A *Must be completed by a HERS Rater	NA	HERS verification required
Air Economizer Controls	§120.5(a)4 §140.4(e)	NA7.5.4	NRCA-MCH-05-A	MCH-03-A MCH-06-A MCH-12-A	Air economizers installed by the HVAC system manufacture and certified to the Commission as being factory installed and calibrated are exempt from the Functional Testing section of NA7.5.4.2
Demand Control Ventilation Systems	§120.1(c)3 §120.5(a)5	NA7.5.5	NRCA-MCH-06-A	MCH-05-A MCH-03-A MCH-12-A	
FDD for Packaged Dx Units	§120.2(i) §120.5(a)11	NA7.5.11	NRCA-MCH-12-A	NA	
Distributed Energy Storage DX AC systems	§120.5(a)13	NA7.5.13	NRCA-MCH-14-A	NA	

Acceptance Tests <i>To be performed after system is installed BUT before final permit</i>	Title 24, Part 6 Section	Nonresidential Appendices Test Method	Required Compliance Forms	Related Compliance Forms	Notes
MECHANICAL					
Complex Mechanical Systems					
Outdoor Air Ventilation Systems VAV systems	§120.5(a)1	NA7.5.1.1	NRCA-MCH-02-A	MCH-07-A	
Supply Fan Variable Flow Controls	§120.5(a)6 §140.4(c)	NA7.5.6	NRCA-MCH-07-A	MCH-02-A	
Supply Water Temperature Reset Controls	§120.5(a)9 §140.4(k)4	NA7.5.8	NRCA-MCH-09-A		
Hydronic System Variable Flow Acceptance	§120.5(a)7 140.4(k)6	NA7.5.9	NRCA-MCH-10-A	MCH-08-A	
Automatic FDD for AHUs and Zone Terminal Units	§120.2(i) §120.5(a)12	NA7.5.12	NRCA-MCH-13-A	NA	
Thermal Energy Storage Systems	§120.5(a)14	NA7.5.14	NRCA-MCH-15-A	NA	
Water-cooled Chillers served by Cooling Towers with Condenser Water Reset Controls	§120.5(a)16	NA7.5.16	NRCA-MCH-17-A	NA	Acceptance Testing not required unless this control strategy is implemented
Valve Leakage Test	§120.5(a)7 §140.4(k)1, 5, 6	NA7.5.7	NRCA-MCH-08-A	MCH-10-A	
Automatic Demand Shed Controls	§120.2(h) §120.5(a)10	NA7.5.10	NRCA-MCH-11-A	NA	
Supply Air Temperature Reset Controls	§120.5(a)15	NA7.5.15	NRCA-MCH-16-A	NA	
Energy Management Control System	§120.5(a)17		NRCA-MCH-18-A	MCH-11-A	
Occupant Sensing Zone Controls		NA7.5.17	NRCA-MCH-19, 20, 21		
COVERED PROCESSES					
Compress Air Systems	§120.6(e)	NA7.13	NRCA-PRC-01-F	NA	
Commercial Kitchen Exhaust	§140.9(b)	NA7.11	NRCA-PRC-02-F	NA	
Enclosed Parking Garages	§120.6(c)	NA7.12	NRCA-PRC-03-F	NA	
Refrigerated Warehouses	§120.6(a)2, 3, 4, 5	NA7.10.1 NA7.10.2 NA7.10.3.1 NA7.10.3.2 NA7.10.3.3 NA7.10.4	NRCA-PRC-04-F NRCA-PRC-05-F NRCA-PRC-06-F NRCA-PRC-07-F NRCA-PRC-08-F	NA	
Elevators (<i>lighting and ventilation controls</i>)	§120.6(f)5	NA7.14	NRCA-PRC-12-F	NA	
Escalators & Moving Walkways (<i>speed controls</i>)	§120.6(g)2	NA7.15	NRCA-PRC-13-F		
Lab Exhaust Ventilation Systems	140.9(c)	NA7.16	NRCA-PRC-14-F		
Fume Hood Automatic Sash Closure	140.9(c)4	NA7.17	NRCA-PRC-15-F		

For More Information

Functional Performance Testing Requirements

- Chapter 13 Acceptance Test Requirements in the Nonresidential Compliance Manual:
energycodeace.com/site/custom/public/reference-ace-2019/Documents/13acceptancetestrequirements.htm
 - An overview of acceptance testing requirements, the process and the forms are further detailed in Chapter 13. Section 13.2 includes a list of certificate of acceptance forms by building component for new or modified tests.
- Nonresidential Reference Appendices NA7:
energycodeace.com/site/custom/public/reference-ace-2019/Documents/7signlighting.htm
 - This Section of the Nonresidential Appendices includes test procedures, roles and responsibilities and other details related to acceptance testing

Compliance Forms

- www.energycodeace.com/NonresidentialForms/2019
 - Dynamic Forms:
 - The newly revised dynamic pdf versions of the NRCC form auto-populate the NRCA and NRCI forms required for your project
 - NRCA forms:
 - The certificates of acceptance themselves are useful to understand required documentation
 - NRCI Forms:
 - The certificates of installation themselves are useful to understand required documentation

California Energy Commission Information & Services

- Energy Code Hotline: 1-800-772-3300 (Free) or Title24@energy.ca.gov
- Online Resource Center:
www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/online-resource-center
 - The Energy Commission's main web portal for Energy Code, including information, documents, and historical information
- Acceptance Test Technician Certification Provider webpage:
www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/online-resource-center/acceptance
- Frequently Asked Questions: Acceptance Test Technician Certification Provider Program:
www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/online-resource-center/acceptance

Additional Resources

- EnergyCodeAce.com

An online "one-stop-shop" providing no-cost tools, training and resources to help appliance and building industry professionals decode and comply with Title 24, Part 6 and Title 20. The site is administered by California's investor-owned utilities.

Please register with the site and select an industry role for your profile in order to receive messages about all our free offerings!



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