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# 13. Acceptance Test Requirements

## 13.1 Overview

### 13.1.1 What Is Acceptance Testing

From simple thermostats and manual light switches to complex building automation systems, controls are integral to building health, safety, comfort, and energy efficiency.

Acceptance test requirements specify targeted inspections and functional performance tests that demonstrate that the building components, equipment, systems, and interfaces conform to the *2019 Building Energy Efficiency Standards* (or *Energy Standards*, inclusive of Reference Nonresidential Appendix NA7), as specified on applicable construction documents (plans).

This helps ensure that the building achieves the energy savings potential specified in its design and protects installing technicians by providing demonstrable proof that the system functioned as required by code when it was installed.

### 13.1.2 Roles and Responsibilities

#### 13.1.2.1 Field Technician

The *field technician* is responsible for performing and documenting the results of the acceptance procedures on the certificate of acceptance documents. The field technician must sign the certificate of acceptance to certify that the information provided on the certificate of acceptance is true and correct. The field technician does not require a contractor's, architect's or engineer's license but may require certification as an acceptance test technician (ATT).



#### When is a Certified Acceptance Test Technician Required?

- Given that the industry certification threshold for certified lighting ATTs has been satisfied, a certified ATT is required to perform the lighting acceptance tests referenced by §130.4 and to sign the certificate(s) of acceptance.
- When the industry certification threshold has been satisfied for mechanical ATTs, a certified ATT will then be required to perform the mechanical acceptance tests referenced by §120.5 and sign the Certificate(s) of Acceptance.

- Other acceptance tests, such as those covering process systems and equipment found in §120.6, do not require that the field technician be a certified ATT.
- Acceptance tests covering the scope of Nonresidential Appendix NA2 are commonly performed by HERS Raters but can be performed by ATT's at the discretion of the local jurisdiction. NA2 covers single-zone systems less than 5,000 square feet (sf.), infiltration (blower door) testing of high-rise residential dwelling units and verifying flow rates of high-rise dwelling ventilation systems.

More information on becoming certified and other information on acceptance test technicians can be found at <http://www.energy.ca.gov/title24/attcp/>.

### 13.1.2.2 Responsible Person

A certificate of acceptance must be signed by a *responsible person* who is licensed and eligible under Division 3 of the Business and Professions Code to take responsibility for the scope of work documented by the certificate of acceptance. In assuming responsibility for the work as a whole, the responsible person assumes responsibility for the acceptance testing work performed by his or her field technician, agent or employee.

The responsible person may perform the acceptance testing if qualified to do so if this is the case, the responsible person must complete and sign *both* the field technician's signature block *and* the responsible person's signature block on the Certificate of acceptance document. (Aside from being licensed, a responsible person that conducts his or her own testing will also need to be a certified ATT if he or she is performing an acceptance test that requires a certified ATT.)

### 13.1.2.3 Acceptance Test Technician

An acceptance test technician (ATT) is a certification standard for technicians that install lighting controls and mechanical system in newly constructed or existing nonresidential buildings. The certification is restricted to applicants with a minimum of three years of professional experience and expertise in either lighting or mechanical controls. Qualifying experience for certification is provided by verifiable employment as an electrical contractor, certified general electrician, licensed architect, professional engineer, controls installation and startup contractor, HVAC installer, mechanical contractor, Testing and Balancing certified technician, or certified commissioning professional with verifiable experience in lighting controls or HVAC installations. ATTs are provided classroom and laboratory training to perform acceptance testing. ATTs must pass classroom and laboratory testing to gain their certification. The ATT is required to work with the Energy Commission approved acceptance test technician certification provider to track and verify quality assurance of his or her acceptance test performance.

### 13.1.2.4 Third-Party HERS Rater or Third-Party Quality Control Program Installer

Most acceptance tests are specifically required to be conducted by an ATT. However, the acceptance tests in NA2 (for single-zone systems less than 5,000 sq. ft., including those serving high-rise multifamily dwellings) are commonly conducted a certified, third-party HERS Rater, given the system designs (and therefore associated duct leakage and flow rate tests) are highly similar to low-rise residential systems. The local enforcement agency can, at its discretion, allow an ATT to conduct these tests.

### 13.1.2.5 Commissioning Provider

A commissioning provider (formerly called a commissioning agent) is not defined by the Energy Standards but is an industry term for a person who may be contracted by the owner to verify functional performance testing is conducted to ensure proper performance at building turnover. Commissioning during construction may or may not be required by §120.8; in general, commissioning is required for newly constructed nonresidential buildings with more than 10,000 square feet in floor area, while smaller buildings are required to complete just the design review phase of commissioning. Section 120.8 does not apply to healthcare facilities, which have parallel requirements in Chapter 7 of the California Administrative Code (Title 24, Part 1), and it does not apply to additions or alterations of existing buildings.

Although system commissioning and acceptance testing are related, not all projects that require acceptance testing will also require commissioning. If a commissioning agent is part of the project team, he or she will often be present for functional performance testing of major building systems to verify they were completed and passed on behalf of the building owner. (Commissioning providers may instead perform acceptance testing themselves, and if this is the case, they will also need to be a certified ATT if they are performing an acceptance test that requires a certified ATT.)

### 13.1.2.6 Enforcement Agency



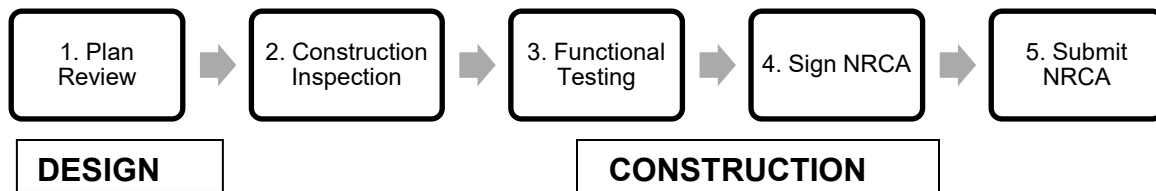
The certificate of acceptance must be submitted to the enforcement agency, typically at time of inspection, to receive the final certificate of occupancy. Enforcement agencies shall not release a *final* certificate of occupancy unless the submitted certificate of acceptance demonstrates that the specified systems and equipment have been shown to be perform in accordance with the applicable acceptance requirements.

The enforcement agency has the authority to require the field technician or responsible person to demonstrate competence to its satisfaction. When a certified ATT is required to complete an acceptance test, the enforcement agency must verify the technician certification status through the Acceptance Test Technician Certification Provider (ATTCP) before issuing a final certificate of occupancy. For details on how to do this most efficiently, see the “Submit NRCA” step below.

### 13.1.3 Acceptance Testing Process

The acceptance requirements require five major checkpoints to be conducted. They are shown in Figure 13-1 below.

Figure 13-1: Steps in the Acceptance testing Process



#### 13.1.3.1 Plan Review

The responsible person must review the plans and specifications to ensure that they conform to the acceptance requirements, typically done before signing a nonresidential certificate of compliance (NRCC). Usually the responsible person for design phase review is the designer, commissioning agent, or test technician.

In reviewing the plans, the responsible person notes the appropriate certificate of compliance then lists all the respective acceptance tests that will be performed and the parties responsible for performing the tests. An exhaustive list is required so that when the acceptance tests are discussed during bid or scope negotiations, all parties are aware of the scope of acceptance testing on the project.

#### 13.1.3.2 Construction Inspection

A visual inspection during construction assures that installed products or equipment are present and capable of complying with the Energy Standards. The construction inspection also assures proper installation of equipment and current calibration.

The responsible person (or, in some cases, the field technician) must perform a construction inspection before testing. Sections 13.4-13.7 of this chapter include construction inspection checklists for each acceptance test.

Reviewing the acceptance requirements in the checklist with the contractor before installation may help the process run smoothly. In some cases, performing tests immediately after installation is most economical, though this requires the complete installation of any associated systems and equipment necessary for proper system operation. Awareness of the acceptance test requirements can allow the contractor to identify a design or construction practice that would not comply with the Energy Standards before equipment installation.

#### 13.1.3.3 Functional Testing

A field technician assumes responsibility for performing the required acceptance requirement procedures. In some cases, the same field technician may not perform all the required acceptance tests for a project. However, for each acceptance test

performed, the field technician who performs the test is responsible for identifying all performance deficiencies and, if necessary, repeating the test until the specified systems and equipment are performing in accordance with the acceptance requirements.

Sections 13.4-13.7 of this chapter include functional testing checklists for each acceptance test.

#### **13.1.3.4 Sign Nonresidential Certificate of Acceptance (NRCA)**

The field technician who performs the testing signs the certificate of acceptance to certify the information recorded on the certificate is true and correct. A responsible person ensures performance of the scope of work specified by the certificate of acceptance and reviews the test results provided by the field technician. The responsible person signs the certificate of acceptance to indicate his or her overall responsibility for the project.

As noted previously, the responsible person may also perform the field technician's responsibilities and, if so, must sign the field technician declaration on the certificate of acceptance. If the acceptance test requires a certified ATT, the responsible person must be a certified ATT to perform the acceptance test.

If the project includes the need for duct leakage testing, then the HERS Rater verification must be performed and submitted, or "registered," with the HERS Provider using the compliance documentation (NRCV). This verification is performed in addition to the acceptance test performed by the technician. However, it is also allowed for a certified Mechanical-ATT to perform the acceptance test and avoid the need for HERS Rater verification.

#### **13.1.3.5 Submit NRCA**

The completed and signed certificate of acceptance must be submitted to the local enforcement agency in accordance with the local laws, ordinances, regulations, or customs. There is no general requirement for a certificate of acceptance to be submitted to any other regulatory agency or to an ATTCP, though specific contractual agreements may require such submissions. For example, in many cases the ATTCP will require that certified ATTs electronically submit all completed certificates of acceptance as a condition of maintaining their certification status.

Building inspectors will review the NRCA documents during inspection and can verify certified ATT status by noting whether the NRCA document was completed electronically through an ATTCP. Lighting controls NRCA documents should not be accepted if completed by hand or electronically outside the ATTCP online interface. Moreover, there is a place for ATTs to enter their certification numbers on the signature block for every NRCA document they sign. ATTCPs list their ATTs (names and certification numbers) on their websites. Depending on which ATTCP logo is shown on the submitted lighting controls NRCA document, the inspector could look up an ATT certification number, if necessary.



### Considerations When Coordinating Acceptance Tests

- When planning construction, consider costs of testing within subcontractor bids, scheduling time within the overall construction schedule and coordination with commissioning if required on the project.
- Purchasing sensors and equipment with calibration certificates often reduces the amount of time required for site calibration, which can lower overall costs.
- In some cases, performing tests immediately after installation or during set-up and commissioning is most economical, though this requires the complete installation of any associated systems and equipment necessary for proper system operation.

## 13.2 Certificate of Acceptance

Certificate of acceptance (NRCA) forms consist of worksheets to document the results of construction inspections and functional testing, as well as a signatory page. Table 13-1 shows the NRCA documents and related references.

**Naming Convention.** The name of the compliance document can give you clues about the documents use. The NRCA prefix indicates a nonresidential certificate of acceptance. The next set of letters specifies the building component; for example, “LTI” indicates indoor lighting. The suffix will tell you whether a certified acceptance test technician “-A” or field technician “-F” is appropriate to perform the functional performance test. Remember that an ATT can act as a field technician, but a current ATT certification is required for someone to sign as an ATT.

Table 13-1: Acceptance Documents

Component	Certificate of Acceptance Test Form Name	Energy Standards Reference	Reference Nonresidential Appendix NA7	Required Certification
Envelope	NRCA-ENV-02-F Fenestration Acceptance	§10-111 & §110.6(a)5	NA7.4.1	NONE
	NRCA-ENV-02-F Window Films	§10-111 & §110.6(a)5	NA7.4.2	Made available to ATT
	NRCA-ENV-02-F Dynamic Glazing	§10-111 & §110.6(a)5	NA7.4.3	Made available to ATT



**Table 13-1: Acceptance Documents**

<b>Component</b>	<b>Certificate of Acceptance Test Form Name</b>	<b>Energy Standards Reference</b>	<b>Reference Nonresidential Appendix NA7</b>	<b>Required Certification</b>
	NRCA-ENV-03-F Clerestories for PAF	§140.3(d)1	NA7.4.4	Made available to ATT
	NRCA-ENV-03-F Interior and exterior horizontal slats for PAF	§140.3(d)2	NA7.4.5	Made available to ATT
	NRCA-ENV-03-F Interior and exterior lighting shelves for PAF	§140.3(d)3	NA7.4.6	Made available to ATT
Mechanical	NRCA-MCH-02-A Outdoor Air Acceptance	§120.1(b)2 & §120.5(a)1	NA7.5.1.1 NA7.5.1.2	ATT not yet required
	NRCA-MCH-03-A Constant Volume, Single Zone, Unitary Air Conditioner and Heat Pump Systems	§120.1(c)2 & §120.2 & §120.5(a)2	NA7.5.2	ATT not yet required
	NRCA-MCH-04-A Air Distribution Systems Acceptance	§120.5(a)3, §140.4(l)	NA7.5.3	ATT not yet required
	NRCA-MCH-05-A Air Economizer Controls Acceptance	§120.5(a)4 & §140.4(e)	NA7.5.4	ATT not yet required
	NRCA-MCH-06-A Demand Control Ventilation Systems Acceptance	§120.1(c)4 & §120.5(a)5	NA7.5.5	ATT not yet required
	NRCA-MCH-07-A Supply Fan VFD Acceptance	§120.5(a)6 & §140.4(c)2B & §140.4(c)2C	NA7.5.6	ATT not yet required
	NRCA-MCH-08-A Valve Leakage Test	§120.5(a)8, §140.4(k)1, §140.4(k)5, §140.4(k)6	NA7.5.7	ATT not yet required
	NRCA-MCH-09-A Supply Water Temperature Reset Controls Acceptance	§120.5(a)9 & §140.4(k)4	NA7.5.8	ATT not yet required
	NRCA-MCH-10-A Hydronic System Variable Flow Control Acceptance	§120.5(a)7, §140.4(k)1, §140.4(k)5, §140.4(k)6	NA7.5.9	ATT not yet required
	NRCA-MCH-11-A Automatic Demand Shed Control Acceptance	§110.12(b), §120.5(a)10	NA7.5.10	ATT not yet required

Table 13-1: Acceptance Documents

Component	Certificate of Acceptance Test Form Name	Energy Standards Reference	Reference Nonresidential Appendix NA7	Required Certification
	NRCA-MCH-12-A Fault Detection & Diagnostics (FDD) for Packaged Direct Expansion Units	§120.2(i), §120.5(a)11	NA7.5.11	ATT not yet required
	NRCA-MCH-13-A Automatic Fault Detection & Diagnostics (FDD) for Air Handling Units & Zone Terminal Units Acceptance	§120.5(a)12	NA7.5.12	ATT not yet required
	NRCA-MCH-14-A Distributed Energy Storage DX AC Systems Acceptance	§120.5(a)13	NA7.5.13	ATT not yet required
	NRCA-MCH-15-A Thermal Energy Storage (TES) System Acceptance	§120.5(a)14	NA7.5.14	ATT not yet required
	NRCA-MCH-16-A Supply Air Temperature Reset Controls Acceptance	§140.4(f), §120.5(a)15	NA7.5.15	ATT not yet required
	NRCA-MCH-17-A Condenser Water Supply Temperature Reset Controls Acceptance	This test is required if this control strategy is implemented. §120.5(a)16	NA7.5.16	ATT not yet required
	NRCA-MCH-18-A Energy Management Control Systems	§110.2(e), §120.2(h), §120.5(a)17, §130.4(b), §130.5(f), §150.0(k)	NA7.7.2	ATT not yet required
	NRCA-MCH-19-A Occupancy Standby	§120.2(e)3 §120.5(a)18	NA7.5.17	ATT not yet required
Indoor Lighting	NRCA-LTI-02-A Lighting Controls	§110.9(b), §130.1(c)	NA7.6.2	ATT
	NRCA-LTI-03-A Automatic Daylighting Controls	§130.1(d)	NA7.6.1	ATT
	NRCA-LTI-04-A Demand Responsive Lighting Controls	§110.12(c)	NA7.6.3	ATT

Table 13-1: Acceptance Documents

Component	Certificate of Acceptance Test Form Name	Energy Standards Reference	Reference Nonresidential Appendix NA7	Required Certification
	NRCA-LTI-05-A Institutional Tuning Power Adjustment Factor	§140.6(a)2J	NA7.7.4.2	ATT
Outdoor Lighting	NRCA-LTO-02-A Outdoor Lighting Acceptance Tests	§110.9(b), §130.2(a & c)	NA7.8	ATT
Covered Process, Systems, and Equipment	NRCA-PRC-01-F Compressed Air System Acceptance	§120.6(e)	NA7.13	NONE
	NRCA-PRC-02-F Commercial Kitchen Exhaust	§140.9(b)	NA7.11	NONE
	NRCA-PRC-03-F Parking Garage Exhaust	§120.6(c)	NA7.12	NONE
	NRCA-PRC-04-F Refrigerated Warehouse – Evaporator Fan Motor Controls Acceptance	§120.6(a)3 §120.6(a)7	NA7.10.2	NONE
	NRCA-PRC-05-F Refrigerated Warehouse – Evaporative Condenser Controls Acceptance	§120.6(a)4 §120.6(a)7	NA7.10.3.1	NONE
	NRCA-PRC-06-F Refrigerated Warehouse – Air-Cooled Condenser Controls Acceptance	§120.6(a)4 §120.6(a)7	NA7.10.3.2	NONE
	NRCA-PRC-07-F Refrigerated Warehouse – Compressor Variable Speed Acceptance	§120.6(a)5 §120.6(a)7	NA7.10.4	NONE
	NRCA-PRC-08-F Refrigerated Warehouse – Electric Resistance Underslab Heating System Acceptance	§120.6(a)2 §120.6(a)7	NA7.10.1	NONE
	NRCA-PRC-12-F Elevator Lighting and Ventilation Controls	§120.6(f)5	NA7.14	NONE
	NRCA-PRC-13-F Escalator and Moving Walkways Speed Control	§120.6(g)2	NA7.15	NONE

Table 13-1: Acceptance Documents

Component	Certificate of Acceptance Test Form Name	Energy Standards Reference	Reference Nonresidential Appendix NA7	Required Certification
	NRCA-PRC-14-F Laboratory exhaust ventilation system acceptance test	§140.9(c)	NA7.16	NONE
	NRCA-PRC-15-F Fume hood automatic sash closure system acceptance test	§140.4(c)4	NA7.17	NONE
	NRCA-PRC-16-F Adiabatic Condenser fan motor variable speed control	§120.6(a)4C §120.6(a)7	NA7.10.3.3	NONE

### 13.3 Detailed Instructions for Conducting Acceptance Tests

Separate files providing detailed instructions on how to conduct acceptance tests are located at the Energy Commission website:  
<https://www.energy.ca.gov/title24/2019standards/>

### 13.4 Changes to Acceptance Test Requirements for the 2019 Energy Standards

#### 13.4.1 Building Envelope §110.6:

- No changes

#### 13.4.2 Mechanical Systems and Equipment §120.5:

- New Acceptance Test:
  - Occupied Standby (NRCA-MCH-19 -A)
- Major Modifications:
  - Demand-responsive controls now require documentation confirming they either are a certified OpenADR VEN or are certified to the Energy Commission as capable of communicating with an OpenADR VEN.
  - Automatic Fault Detection and Diagnostics (FDD) for air handling units and zone terminal units (NRCA-MCH-13-A)
    - Separation of Air Handling Unit functional test into functional tests for economizers and valves.

- Significant modifications to functional test for air handling unit economizers.
- New functional test added for air handling unit valves.
- Minor Clarifications
  - Air distribution systems (NRCA-MCH-04-E), allowed alternative to HERS Rater verification with certified ATT.

### **13.4.3 Lighting Controls**

- New Acceptance Tests: None.
- Major Modifications:
  - Demand-responsive controls now require documentation confirming they either are a certified OpenADR VEN or are certified to the Energy Commission as capable of communicating with an OpenADR VEN.
  - The functional testing for outdoor lighting controls (NRCA-LTO-02-A) has been simplified.
- Minor clarifications:
  - The role of the lighting controls ATT is clarified for the power adjustment factor allowances as a document reviewer only.
  - There are minor revisions to the lighting controls (NRCA-LTI-02-A) automatic time switch lighting controls functional testing procedures.

### **13.4.4 Covered Process Systems and Equipment**

- New Acceptance Tests:
  - Laboratory Exhaust Ventilation System Acceptance Test (NRCA-PRC-14-F)
  - Fume Hood Automatic Sash Closure System Acceptance Test (NRCA-PRC-15-F)
  - Adiabatic Condensers and Condenser Fan Motor Variable Speed Control (NRCA-PRC-16-F).
- Major Modifications: None.
- Minor Clarifications: None.

## **13.5 Acceptance Test Technician Certification Provider (ATTCP)**

### **13.5.1 Provider Qualifications**

The requirements to become either a nonresidential lighting controls or mechanical Acceptance Test Technician Certification Provider (ATTCP) are very similar. Therefore, this section will address both the lighting controls and mechanical ATTCP application requirements together, calling out specific differences when warranted. The prospective ATTCP must submit a written application to the Energy Commission that documents the following major elements:

#### **13.5.1.1 Organizational Structure**

ATTCPs shall provide written explanations of the organization type, bylaws, and ownership structure. ATTCPs shall explain in writing how their certification program meets the qualification requirements of §10-103.1(c) (or §10-103.2(c)). ATTCPs shall explain in their application to the Energy Commission their organizational structure and their procedures for independent oversight, quality assurance, supervision and support of the acceptance test training, and certification processes (§10-103.1(c)1 and §10-103.2(c)1).

This requirement is necessary to ensure, at a minimum, that the organizations providing certification services to the building industry have a business structure that is conducive to train, certify, and oversee ATTs.

The Energy Commission has approved several ATTCP applicants and all applications included articles of incorporation, bylaws, and trust agreements. One approved application included the Section 501(c) status (with the corresponding employer identification number) of the organization. A copy of the ethics policy for the ATTCP is recommended.

This section of the application should also include a description of how the organization is conducive to providing training, certification, oversight, and support to the technicians that they will be certifying. The ATTCP may also describe what qualifications and experience the ATTCP may have to operate and oversee an accreditation program.

#### **13.5.1.2 Certification of ATEs**

The ATTCPs shall provide written explanations of their certification and oversight of acceptance test employers (ATEs) that employ ATTs. This explanation shall document how the ATTCP ensures that the ATEs are providing quality control and appropriate supervision and support for their ATTs (§ 10-103.1(c)2 and §10-103.2(c)2).

The ATTCP shall recertify all ATEs before implementing each adopted update to the Energy Standards as these updates affect the acceptance test requirements.

Recertification requirements and procedures shall only apply to those specific elements that are new or modified in future updates to Energy Standards.

ATEs must have an understanding of what tasks the ATT is responsible to complete. Moreover, the ATE must manage and provide support to the ATTs in performing their tasks. The ATTCP is required to describe the training and requirements that they will place on the ATE for these endeavors and issue certificates to qualified ATE applicants. The requirement for the ATEs to be retrained for each new code cycle is intended to maintain the current educational level of the ATEs. The quality control that the ATEs provide to the ATTs is different from the quality control that the ATTCPs provide.

The Energy Commission recognizes that there are many roads to compliance regarding ATE training, certification, and oversight. Technical training typically consists of 4 to 24 hours of instruction. Quality control, supervision, and support requirements implemented by the ATTCP on the ATE can vary considerably. Some elements that the ATTCP might consider implementing, but that are not specifically required by the Energy Commission regulations, include the following:

- The ATTCP may develop a policy to address where a change in employment results in no ATE manager or supervisor having completed the ATE training.
- The ATTCP may adopt an ethics policy for ATEs.
- Union contracting requirements: The ATTCP may be restricted to serving unionized technicians only and as a result the ATTCP may require that the ATE be a party in good standing with a union contract. This may entail several significant requirements for the ATE.
- Third-party certificate holders: The ATTCP may require that the ATE hold a valid certificate from a third party, such as specific types of testing and air balancing (TAB) training.
- Multiple office management requirements: The ATTCP may consider how it will implement ATE training and certification requirements where an ATE has multiple offices. The ATTCP may consider requiring that an ATE with multiple offices shall ensure a middle or senior management level employee at each office has completed the ATE certification training.
- Restrictive employment practices: The ATTCP may restrict the ATE from employing an ATT that is certified by a different ATTCP. Furthermore, the ATTCP may restrict the ATE from holding certificates from multiple ATTCPs.
- Licensing, insurance, and safe practices requirements: The ATTCP may require the ATE to provide initial and ongoing proof of workers' compensation and general liability insurance (typically a minimum dollar amount is specified), local business licenses, injury and illness prevention program, and Code of Safe Practices (typically required to be consistent with the California Code of Regulations, Sections 1509 and 3203).

- **Equipment Policy:** The ATTCP may require the ATE to agree to requirements for ensuring that the ATE and ATT possess and properly maintain diagnostic equipment.

### **13.5.1.3 Training and Certification Procedures**

These requirements are the most significant of the ATTCP regulations. They encapsulate all the required training, testing, certification, and oversight for the ATTs and ATEs that the ATTCP must provide. These requirements describe the level of experience, education, professionalism, and accountability of the ATT that the Energy Commission is seeking and that the ATTCP must enforce.

ATTCPs shall include with their application a complete copy of all training and testing procedures, manuals, handbooks, and materials. ATTCPs shall explain in writing how their training and certification procedures include, but are not limited to, the following (§10-103.1(c)3 et sec and §10-103.2(c)3 et sec):

#### **A. Training Scope**

The ATT training must include both classroom and laboratory training. In essence, the ATT must be instructed on all acceptance tests and then practice those instructions in a laboratory setting. Furthermore, the ATT must be educated on the general science regarding acceptance testing, as well as the procedure to complete and submit the correct acceptance test documents.

#### **B. ATT Training**

##### **i. Curricula.**

ATTCP training curricula for lighting controls and mechanical ATTs shall include, but not be limited to, the analysis, theory, and practical application of the items listed in §10-103.1(c)3Bi and §10-103.2(c)3Bi, respectively. These include training on the acceptance tests themselves.

Several approved ATTCPs require extensive classroom training to accomplish this educational requirement. One approved ATTCP requires that each applicant hold a third-party certificate of training that the Energy Commission found to be equivalent to the curricula required.

##### **ii. Hands-on training.**

The ATTCP shall describe in its application the design and technical specifications of the laboratory boards, equipment, and other elements that will be used to meet the hands-on requirements of the training and certification.

##### **iii. Prequalification.**

Participation in the certification program shall be limited to persons who have at least three years of professional experience and expertise in either lighting controls and electrical systems or mechanical systems, as determined by the ATTCP.



Professional experience is defined by the ATTCP, but generally means experience in a professional occupation that provides training and work experience related to the systems subject to lighting controls or mechanical acceptance testing. The ATTCP must clarify the process that it will use to determine what experience is considered professional and relevant to either lighting controls or mechanical acceptance testing, as well as to what extent the ATTCP will verify that experience. The following are some relevant questions that the ATTCP should consider when establishing an ATT applicant's prequalified experience, though not specifically required by regulation:

- How is the experience documented (for example, letters from employers or other written evidence), and how is it related to lighting controls or mechanical acceptance testing requirements?
- Should professional experience be demonstrated by requiring applicants to be certified in specifically identified professions, such as:
  - California licensed electrical contractors.
  - California licensed mechanical or HVAC contractors.
  - California certified general electricians.
  - California licensed air conditioning repair contractors.
  - California licensed professional engineers.
  - Lighting control manufacturer representative.
  - Certified commissioning professionals.
  - Other professional occupations that are demonstrated to provide industry- accepted training and work experience relevant to the systems subject to lighting control or mechanical acceptance testing.

For the 2019 Energy Standards, a note was added to specifically allow ATTCPs to adopt additional prequalification requirements for ATTs, such as “shall not be decertified by another ATTCP.” Any such additional requirements are at the ATTCP's discretion and not required by the Energy Commission.

#### iv. **Instructor-to-Trainee Ratio**

The ATTCP shall document in its application to the Energy Commission why its instructor-to-trainee ratio is sufficient to ensure the integrity and efficacy of the curriculum and program based on industry standards and other relevant information.

Typically, the instructor-to-student ratio for classroom training is much higher than for laboratory training. In the applications that the Energy Commission has approved, classroom instructor to student ratios were between 1:25 and 1:35. For laboratory training, the ratios were between 1:6 and 1:12. Most important, each ATTCP application included a discussion of the basis for each ratio.

#### v. **Tests**

The ATTCP shall describe the written and practical tests used to demonstrate each certification applicant's competence in all specified subjects. The ATTCPs shall retain all results of these tests for five years from the date of the test.

When developing and implementing both written and practical tests, the ATTCP may consider the following issues:

- Subject matter experts should validate exams by for content.
- Pilot testing and statistical analysis by qualified psychometricians can identify poor quality questions and bias, as well as validating a passing score.
- Checking exam question response option frequency and other measurements of consistency may help validate the exam rigor and justify passing scores and performance standards.
- Exam questions should be evaluated annually to confirm reliability, rigor, and lack of bias.
- Lack of bias should be Validated consistent with the Uniform Guidelines on Employee Selection Procedures (1978) Federal Register, 43(166), 38290-38315.

Measures should be adopted to ensure exam security, such as having multiple versions of exams with random question generation and at least twice the number of questions in a validated question bank than are scored on any given test.

vi. **Recertification.**

The ATTCP shall recertify all ATTs before implementing each adopted update to the Energy Standards when these updates affect the acceptance test requirements. Recertification requirements and procedures shall apply only to those specific elements that are new or modified in future updates to the Energy Standards.

The ATTCP shall develop recertification training curricula for ATTs consistent with training requirements in §10-103.1(c)3A and §10-103.1(c)3B (or §10-103.2(c)3A and §10-103.2(c)3B) and shall submit the proposed recertification training curricula to the Energy Commission for review and approval in the update report required under §10-103.1(d)2 (or §10-103.2(d)2). Once approved, the ATTCP will implement the recertification process.

**C. ATE Training**

Training for ATEs shall consist of at least a single class or webinar consisting of at least four hours of instruction that covers the scope and process of the lighting controls or mechanical systems acceptance tests in the Energy Standards.

**D. Complaint Procedures**

The ATTCPs shall describe in their applications to the Energy Commission procedures for accepting and addressing complaints regarding the performance of any ATT or ATE certified by the ATTCP and explain how building departments and the public will be notified of these proceedings.

#### **E. Decertification Procedures**

The ATTCPs shall describe in their applications to the Energy Commission procedures for revoking their certification of ATTs and ATEs based upon poor quality or ineffective work, failure to perform acceptance tests, falsification of documents, failure to comply with the documentation requirements of these regulations, or other specified actions that justify decertification. The ATTCP shall also describe its general procedures for decertified ATTs or ATEs seeking to regain their certification status, including eligibility requirements for recertification (if any).

#### **F. Quality Assurance and Accountability**

The quality assurance and accountability requirements for lighting controls and mechanical ATTCPs vary significantly for the 2019 Energy Standards, so they will be discussed separately.

- Lighting Controls

The ATTCP shall describe in its application to the Energy Commission its procedures for conducting quality assurance and accountability activities, including, but not limited to, the following:

- The ATTCP shall include quality assurance and accountability measures, including, but not limited to, independent oversight of the certification materials, processes, and procedures; visits to building sites where certified technicians are completing acceptance tests; certification process evaluations; building department surveys to determine acceptance testing effectiveness; and expert review of the training curricula developed for Energy Standards §130.4.
- The ATTCP shall review a random sample of no fewer than 1 percent of each ATT's completed compliance forms and shall perform randomly selected on-site audits of no fewer than 1 percent of each ATT's completed acceptance tests. Independent oversight may be demonstrated by accreditation under the ISO/IEC 17024 standard.

The consequences of failed audits should be fully described by the ATTCP. ATTCPs might consider whether to require a higher percentage of document and on-site audits the first few years of operation to ensure that any initial issues with training or compliance are identified and addressed.

For example, one ATTCP proposed the following:

- For the first three years of operation, review a random sample of 6 percent of each technician's completed documents and perform on-site audits of 6 percent of acceptance tests.
  - For years 4 and 5 of the ATTCP operation, review a random sample of 4 percent of each technician's completed documents and perform on-site audits of 4 percent of acceptance tests.
  - After five years of operation, reduce a random sample of 2 percent of each ATT's completed compliance documents and perform on-site audits of 2 percent of acceptance tests.
- Mechanical Systems

The ATTCP shall describe in its applications to the Energy Commission procedures for conducting quality assurance and accountability activities, including, but not limited to, the following:

- The ATTCPs shall include quality assurance and accountability measures, including, but not limited to, independent oversight of the certification materials, processes, and procedures; visits to building sites where ATTs are completing acceptance tests; certification process evaluations; building department surveys to determine acceptance testing effectiveness; and expert review of the training curricula developed for Energy Standards§120.5.
- The ATTCP shall review a random sample of no fewer than 1 percent of each ATT's completed compliance forms. The ATTCP shall also randomly select and shadow audit no fewer than 1 percent of each ATE's overseen projects, following the assigned ATT and observing his or her performance on the job site. Independent oversight may be demonstrated by accreditation under the ISO/IEC 17024 standard.

The mechanical regulation generally follows the same requirements as lighting controls, except the focus for on-site audits is on the ATEs rather than the ATTs.

#### **G. Certification Identification Number and Verification of ATT and ATE Certification Status**

The ATTCP shall describe in its applications to the Energy Commission procedures for recording, tracking, and communicating certification status, including but not limited to the following:

- Upon certification of an ATT or ATE, the ATTCP shall issue a unique certification identification number to the ATT or ATE.
- The ATTCP shall maintain an accurate public record of the certification status for all ATTs and ATEs that the ATTCP has certified, including any ATTs or ATEs who have been decertified as specified in §10-103.1(c)3E or §10-103.2(c)3E.

- The ATTCP shall provide verification of current ATT certification status upon request to authorized document registration provider personnel or enforcement agency personnel to determine the ATT's eligibility to sign certificate of acceptance documentation.

Energy Standards compliance will also be simplified by requiring the ATT to include its assigned certification number on the compliance documentation, thereby allowing the enforcement agency and the Energy Commission to track the effectiveness of this certification program.

The ATTCP is not required to implement an on-line presence of any kind for compliance with these regulations. However, the applications that the Energy Commission has approved all include the implementation of an online presence to contend with the ATT/ATE application processing, complaints process, certification status, and ATT/ATE contact information.

### **13.5.2 Requirements for ATTCPs to Provide Regular Reports**

[Section 10-103.1\(d\)](#) and [§10-103.2\(d\)](#) require ATTCPs to submit two periodic reports to the Energy Commission. All required reports shall contain a signed certification that the ATTCP has met all requirements for this program.

These reporting requirements are intended to ensure that the Energy Commission has a reasonable level of control on the ATTCP without being unnecessarily involved in the day-to-day operations of the ATTCP.

#### **13.5.2.1 Annual Report**

The ATTCP shall provide an annual report to the Energy Commission that includes:

1. A summary of the certification services provided over the reporting period, including the total number of ATTs and ATEs certified by the ATTCP during the reporting period and to date.
2. A summary of all actions taken against any ATT or ATE as a result of the complaint or quality assurance procedures described by the ATTCP as required under §10-103.1(c)3D and §10-103.1(c)3F (or §10-103.2(c)3D and §10-103.2(c)3F).
3. A summary of the quality assurance and accountability activities conducted over the reporting period, including the compliance forms reviewed and the on-site audits performed as required under §10-103.1(c)3F(ii) (or §10-103.2(c)3F(ii)) during the reporting period and to date.
4. A summary of the number and type of acceptance tests performed in each local jurisdiction over the reporting period and to date.
5. A signed certification to the Energy Commission that the ATTCP continues to meet the requirements of §10-103.1 (or §10-103.2).

The annual report can include adjustments that are proposed, however, these proposals must be approved according to the application amendment process in §10-103.1(f) or §10-103.2(f).

### **13.5.2.2 Update Report**

The ATTCP shall have no less than six months following the adoption of an update to the Energy Standards to prepare an update report. The ATTCP shall submit an update report to the Energy Commission not less than six months before the effective date of any newly adopted update to the Energy Standards. The ATTCP shall report to the Energy Commission what application amendments are proposed to address changes to the Energy Standards or to ensure training reflects the variety of lighting controls (or mechanical systems) that are encountered in the field.

All required update reports shall contain a signed certification that the ATTCP continues to meet the requirements §10-103.1 (or §10-103.2). Update reports shall be approved through the amendment process provided under §10-103.1(f) (or §10-103.2(f)).

### **13.5.3 Amendment of ATTCP Applications**

The ATTCP may amend a submitted or approved application as described in §10-103.1(f) and §10-103.2(f). The amendment process is intended to give the ATTCP an opportunity both during its initial application approval process and post approval to modify its application or operations. This is so that ATTCPs can operate as openly as possible with the Energy Commission and address issues as they arise.

The amendment process depends on whether changes being made to an ATTCP application are substantive or non-substantive. Substantive amendments will require an approval from the Energy Commission at a regular business meeting. Non-substantive amendments can be approved by the Executive Director. The requirements and approval process for both types of amendments are discussed in detail below.

#### **13.5.3.1 Amendment Scope**

##### **A. Non-substantive Changes**

A non-substantive change is a change that does not substantively alter the requirements of the application materials for the ATTCP, ATT, or ATE. For amendments making only non-substantive changes, the ATTCP shall submit:

- A letter describing the change to the Energy Commission as an addendum to the application.
- A replacement copy of the affected sections of the ATTCP application with the changes incorporated.

- A copy of the affected sections of the ATTCP application showing the changes in underline and strikeout format.

### **B. Substantive Changes**

A substantive change is a change that substantively alters the requirements of the application materials for the ATTCP, ATT, or ATE. For amendments making any substantive changes, the ATTCP shall submit the following:

- A document describing the scope of the change to the application, the reason for the change and the potential impact to the ATTCP, ATT, and ATE as an addendum to the application;
- A replacement copy of the affected sections of the ATTCP application with the changes incorporated; and
- A copy of the affected sections of the ATTCP application showing the changes in underline and strikeout format.

#### **13.5.3.2 Amendment Review**

Amendments submitted prior to approval of an ATTCP application shall be included in the application's application review and determination process specified in §10-103.1(e) or §10-103.2(e).

Amendments submitted after approval of an ATTCP's application that contain only non-substantive changes shall be reviewed by the Executive Director for consistency with §10-103.1 or §10-103.2. Amendments determined to be consistent with this section shall be incorporated into the approval as errata.

Amendments submitted after approval of an ATTCP's application that contain any substantive changes shall be subject to the application review and determination process specified in §10-103.1(e) or §10-103.2(e). If the Energy Commission finds that the amended application does not meet the requirements of §10-103.1 or §10-103.2, then the ATTCP shall either abide by the terms of their previously approved application or have its approval suspended.

### **13.5.4 Nonresidential Mechanical Acceptance Test Training and Certification**

The mechanical ATTCP still has one additional consideration compared to the lighting controls ATTCP. The lighting controls ATTCPs have satisfied the industry certification threshold requirements in §10-103.1(b), which means that only certified ATTs can perform lighting controls acceptance testing. The Mechanical ATTCPs, as of this writing, have not satisfied the following threshold requirements (§10-103.2(b)):

1. A minimum of 300 mechanical ATTs have been trained and certified to complete the acceptance tests of §120.5 by ATTCP(s) approved by the Energy Commission.
2. ATTCPs must provide reasonable access to the training and certification for the following industry groups: professional engineers, HVAC installers, mechanical contractors, TABB certified technicians, controls installation and startup contractors, and certified commissioning professionals who have verifiable training, experience, and expertise in HVAC systems. The Energy Commission will determine “reasonable access” by considering factors such as certification costs commensurate with the complexity of the training being provided, certification marketing materials, prequalification criteria, curriculum, and class availability throughout the state.

Until these requirements are met, field technicians can complete mechanical acceptance tests in §120.5 without being a certified mechanical ATT. When appropriate, the Energy Commission will take up the question of the threshold requirements for the nonresidential mechanical ATTCP program.