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# the NEWS

## California Launches Nonresidential Acceptance Testing

A familiar idea — newly enforced — ushers in a layer of verification for contractors, owners



**COMPLIANCE BEFORE COMMERCE:** When the next strip mall goes up in California, performance tests for everything from duct leakage to rooftop units to kitchen exhaust will precede occupancy permits. (Courtesy Upstatnyer (CC S-A 3.0))

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*Robert Beverly*

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A piece of major HVAC equipment might list an efficiency rating, but in reality, it's more like a hope or a wish — with several “if's” standing between the customer and the performance they are paying for.

California recently took a concrete step to close the gap between hope and reasonable expectation for nonresidential project customers. In October, the state began enforcing acceptance testing requirements for mechanical and lighting systems on commercial projects.

Strictly speaking, the relevant material is Title 24, Part 6, Subchapter 3, Section 120.5 of California's 2016 Energy Code. Under the code, lighting controls only have five acceptance tests, but mechanical systems testing addresses up to 19 types of equipment before an occupancy permit is granted.

“While no contractor wants additional regulations, the concept of testing the nonresidential equipment being installed to ensure that it actually works properly in terms of economizer and the controls that have a major effect on energy use, actually makes sense to me,” said Bill Brown, director of Brownson Technical School in Anaheim. But as he noted, there's a flip side.

“Like all of Title 24, it appears to be very prescriptive, and that annoys many contractors.”

## **Acronyms & Adjustments**

This new standard operating procedure generates some ripple effects through a project team and its process. It has also generated some new professional positions within the industry. Acceptance Test Technicians (ATT) conduct the actual testing in the field.

Acceptance Test Employers (ATE), as one might expect, are the certified companies who employ the ATTs and ensure that they are executing their duties properly.

But who certifies an ATE? That would be the role of an Acceptance Test Technician Certification Provider, which can also train the technicians.

The ATT's job begins well before equipment is in place and ready for its close-up. Joe Loyer, senior mechanical engineer with the CEC, explained.

“Acceptance testing has two main sections: construction inspection and functional testing,” he said.

The construction inspection verifies that the construction is complete and compliant with the design requirements and the Energy Code.

“To ensure that the design has been followed, the ATT must have access to the approved plans (including change orders) as well as the Nonresidential Certificates of Compliance (NRCCs). Access to the design documents and the NRCCs is required as part of the Construction Inspection of the acceptance test,” Loyer said.

NRCCs are completed by the project designer or engineer of record acting as the responsible person, and submitted to the AHJ with the planning documents required for a permit application.

“The ATT must be able to show that the design requirements shown on the NRCCs have been implemented in the construction inspection phase of acceptance testing. This is one of the main reasons why ATTs should be brought on early in the design phase.”

This much highlights one change at the engineer level. Loyer explained many designers and engineer of record are not used to including the NRCCs in the permit application. They will have to now, in order for ATTs to complete their responsibilities.

## **Testing, Testing ...**

A full rundown of the potential equipment-related compliance forms for an HVAC project's functional testing, depending on the building type and scope of the system, is as follows:

- Outdoor Air
- Constant-Volume Single-Zone HVAC
- Air Distribution Duct Leakage
- Air Economizer Controls
- Demand Control Ventilation
- Supply Fan Variable Flow Controls
- Valve Leakage Test
- Supply Water Temperature Reset Controls
- Hydronic System Variable Flow Controls
- Automated Demand Shed Controls
- Packaged Direct-Expansion Units
- Air Handling Units & Zone Terminal Units
- Distributed energy Storage DX/AC Systems
- Thermal Energy Storage
- Supply Air Temperature Reset Controls
- Condenser Water Temperature Reset Controls
- Energy Management Control Systems
- Compressed Air Systems
- Kitchen Exhaust
- Elevator Lighting & Ventilation Controls

Refrigerated warehouses earn some extra attention:

- Evaporator Fan Motor Controls
- Evaporative Condenser Controls
- Air Cooled Condenser Controls
- Variable-Speed Compressor

The ATT may be obliged only to inform a client of design and installation aspects that are not code-compliant, but as Loyer observed, the ATT is as liable for code compliance as much as the project designer or engineer of record.

Loyer adds that “ATTCPs provide an electronic database system to assist the ATT in the performance of the required acceptance test. Once the ATT has performed the acceptance test, the results are recorded by the ATTCP database. The ATTCP database can then produce a watermarked version of the acceptance test form for the ATT to submit to the AHJ.”

The CEC has designed the ATTCP certification program so that its benefits extend beyond techs passing those lab and field exams. Loyer explained that AATCP ongoing quality assurance requirements draw on data input screening, desk audits, and on-site audits.

## **In-House Inspectors?**

The general concept will sound familiar to HVAC professionals who deal with or who work in commissioning. A commissioning agent works to verify the system operates as intended before occupancy and is generally a third-party contact, brought on preferably at the start of or early on in the project.

The California requirement formalized testing but did not implement one division common in commissioning.

“One of the main ideas that the CEC considered and rejected for the ATTCP program was to establish the certified ATTs as independent third-party inspectors,” Loyer noted. “The CEC determined that this approach was unworkable for nonresidential projects for many reasons.”

The CEC concluded that training contractors directly about Energy Code compliance was more productive than “trying to create another level of inspection outside of the AHJ authority,” Loyer said.

That decision opens up one interesting door for HVAC contractors whose work now must pass these tests: They can employ and use an ATT of their own.

Art Miller, CMS, RCT, serves as RSES International vice president and explained how this can work.

“A contractor will have to attend at least four hours of training and pass an exam in order to install any equipment over 52,000 Btuh,” Miller said. At that point, the contractor is an ATE.

“Then any technician who does start-ups of equipment will have to attend training on the type of equipment they would be performing an acceptance test on. Therefore, a technician will have to attend classroom/online training and pass an exam,” he outlined.

Once technicians pass any and all pertinent performance exams, they earn ATT status. Miller noted that there would be yearly renewal fees for both the employer and the technician.

Loyer said that ATTCPs (of which RSES is one) have a variety of options for training and certification for technicians, contractors, designers, and engineers.

“ATT applicants are required to have a minimum of three years installation or design experience, and some ATTCPs require additional training or experience as a prerequisite,” he said.

Weekend, night, and online classroom training can provide a flexible schedule for the laboratory side of the training.

Loyer pointed out that not all ATTCPs charge the same thing, and CEC is not involved in pricing, so “any perspective ATT applicant should contact several ATTCPs for costs and training schedules.”

“I would imagine that contractors of a certain size will want to train their personnel to do these tests so they can avoid the cost of hiring a 3<sup>rd</sup>-party testing organization” said Brown of Brownson Technical School.

Loyer said the CEC is recommending that designers and engineers also get certified as ATTs, too. Either way, he said, “Having these skills and training in-house can serve to avoid project schedule delays as well as proving a useful skill in job bids.”

## **Ingnore Economizers No More**

Asked where HVAC contractors might have the most “catching up” to do in terms of skills or organizational readiness for the testing requirement, RSES’ Miller says simple awareness of the requirement itself may be the biggest initial hurdle.

Brown pointed readers to [www.mechanicalacceptancetesting.com](http://www.mechanicalacceptancetesting.com) as a resource for those interested in exploring ATT work.

As far as more specific tasks, Brown sees one equipment type as deserving better treatment.

“With all due respect to our contractors, we have all seen economizers either disconnected at installation or disabled after that,” Brown said. Increased understanding of that equipment would go a long way toward achieving desired efficiencies.

At RSES, Miller hopes the new regulation will reflect well on the HVAC industry in the public eye, as it strives to make sure new equipment performs per the manufacturer’s requirements and realizes its energy saving capabilities.

As with many initiatives that went before it, this code component is already attracting attention elsewhere. “I have heard that there may be as many as three states looking at how this will play out in California,” Miller said, “and if it does, they may move to adopt a similar or equal code requirement.”

## **A Long Time Coming**

“When I explain to someone outside of the HVACR industry what mechanical acceptance testing involves,” said Bill Brown, director of Anaheim’s Brownson Technical School, “I usually get asked the same thing: ‘Hasn’t this always been required?’ No, it hasn’t.”

That’s correct, although the requirement has been quite a long time coming from idea to the reality.

The beginning of this century saw more than one significant rash of brownouts and blackouts in California.

“Upon conducting a thorough investigation, the problem was not the grid, but the mechanical systems plugged into the grid,” recalled Howard Weiss, executive vice president at ESCO Group in Denver.



Indeed, Michael Messenger wrote a “Staff Report Strategic Plan To Reduce The Energy Impact of Air Conditioners” for the CEC in 2008. By that time, it was clear that conservation via user habits and improved equipment efficiencies would not put enough of a dent in the upward trend of consumption. The state needed better installations and installers.

CEC’s Joe Loyer picks up the trail.

“It was not until the 2013 Energy Code that the CEC codified the requirements for installing technicians in both lighting controls and mechanical acceptance testing to be formally trained and certified to perform the required acceptance testing.”

The CEC determined a sufficiency of certified acceptance test technicians to start requiring lighting-related tests carried out exclusively by lighting ATTs back in July of 2014. Reaching that personnel threshold for the HVAC-related testing and technicians, however, would take another seven years.

In April of 2021, the CEC determined that the state had enough ATTs in place to begin enforcing the testing requirement that had actually become part of the energy code in 2016. The requirement went “live” on Oct. 1 of this year.

What may still seem like a sudden development for engineers, contractors, and owners is actually anything but.

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