

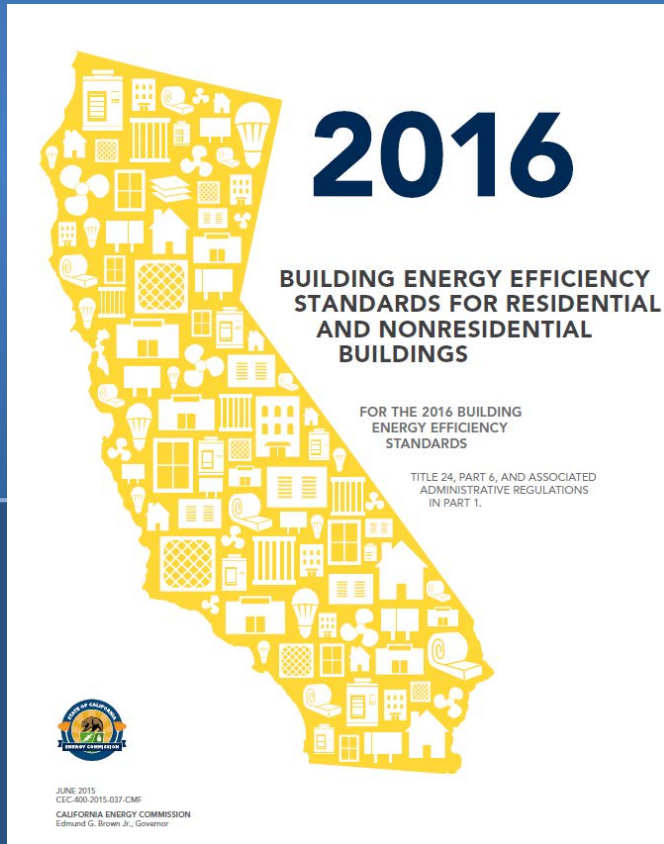
DOCKETED

Docket Number:	13-ATTCP-01
Project Title:	Acceptance and Training Certification
TN #:	211623-2
Document Title:	Presentation - California 2016 Building Energy Efficiency Standards for Nonresidential Buildings
Description:	N/A
Filer:	Patty Paul
Organization:	National Energy Management Institute Committee (NEMIC)
Submitter Role:	Public
Submission Date:	5/24/2016 1:55:30 PM
Docketed Date:	5/24/2016



NATIONAL ENERGY MANAGEMENT INSTITUTE COMMITTEE

CALIFORNIA 2016 BUILDING ENERGY EFFICIENCY STANDARDS FOR NONRESIDENTIAL BUILDINGS



Notable Changes to the 2013 Version

- ▶ The purpose of this webinar is to familiarize yourself with the changes to the 2016 Building Energy Efficiency Standards (“Standards”), and in particular, any changes to the Nonresidential Compliance Manual and the mandated mechanical acceptance tests.
- ▶ You are required to attend this webinar as part of the recertification requirements as set forth by the Standards as well as by Section 2.3 *Renewal of Certification* of the NEMIC ATTCP Certification Manual. Failure to do so will result in decertification.

Overview

- ▶ The most significant efficiency improvements to the nonresidential Standards include alignment with the ASHRAE 90.1 2013 national standards.
- ▶ New efficiency requirements for elevators and direct digital controls are included in the nonresidential Standards.
- ▶ The 2016 Standards also include changes made throughout all of its sections to improve the clarity, consistency, and readability of the regulatory language.

Overview

- ▶ Changes to Standards Part 1 - California Building Standards Administrative Code
- ▶ Changes to Standards Part 6 - California Energy Code
- ▶ Changes to Nonresidential Appendix NA7 – *Installation and Acceptance Requirements for Nonresidential Buildings and Covered Processes*

Overview

- ▶ The California Code or Regulation Title 24 is organized into separate parts:
 - Part 1 - California Building Standards Administrative Code
 - Part 2 - California Building Code
 - Part 2.5 - California Residential Building Code
 - Part 3 - California Electrical Code
 - Part 4 - California Mechanical Code
 - Part 5 - California Plumbing Code
 - Part 6 - California Energy Code

CHANGES TO STANDARDS PART 1 – California Building Standards Administrative Code

10-103.2 – NONRESIDENTIAL MECHANICAL ACCEPTANCE TEST TRAINING AND CERTIFICATION

- ▶ (b)1A. No changes with regard to number of (300) Certified Acceptance Test Technicians for the mandates to take effect.
- ▶ (c)3B(vi) Recertification. The ATTCP shall recertify all Acceptance Test Technicians and Acceptance Test Employers prior to the implementation of each adopted update to the Building Energy Efficiency 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 Building Energy Efficiency Standards.

10-103.2 – NONRESIDENTIAL MECHANICAL ACCEPTANCE TEST TRAINING AND CERTIFICATION

- ▶ (b)1A. No changes with regard to number of (300) Certified Acceptance Test Technicians for the mandates to take effect.
- ▶ (c)3B(vi) Recertification. The ATTCP shall recertify all Acceptance Test Technicians and Acceptance Test Employers prior to the implementation of each adopted update to the Building Energy Efficiency 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 Building Energy Efficiency Standards.

CHANGES TO STANDARDS PART 6 – California Energy Code

TABLE 100.0-A APPLICATION OF STANDARDS

Occupancies	Application	Mandatory	Prescriptive	Performance	Additions/Alterations
General Provisions for All Buildings		100.0, 100.1, 100.2, 110.0			
Nonresidential, High-Rise Residential, And Hotels/Motels	General	120.0	140.0, 140.2	140.0, 140.1	141.0
	Envelope (conditioned)	110.6, 110.7, 110.8,120.7	140.3		
	Envelope (unconditioned process spaces)	N.A.	140.3(c)		
	HVAC (conditioned)	110.2, 110.5, 120.1, 120.2, 120.3, 120.4, 120.5, 120.8	140.4		
	Water Heating	110.3, 120.3, 120.8, 120.9	140.5		
	Indoor Lighting (conditioned, process spaces)	110.9, 120.8, 130.0, 130.1, 130.4	140.3(c), 140.6		
	Indoor Lighting (unconditioned and parking garages)	110.9, 120.8, 130.0, 130.1, 130.4	140.3(c), 140.6	N.A.	
	Outdoor Lighting	110.9, 130.0, 130.2, 130.4	140.7		
	Electrical Power Distribution	110.11, 130.5	N.A.		
	Pool and Spa Systems	110.4, 110.5, 150.0(p)	N. A.		
	Solar Ready Buildings	110.10	N.A.		141.0(a)

SECTION 110.2 – MANDATORY REQUIREMENTS FOR SPACECONDITIONING EQUIPMENT

This update brings the minimum efficiency requirements in alignment with ASHRAE 90.1.

TABLE 110.2-A ELECTRICALLY OPERATED UNITARY AIR CONDITIONERS AND CONDENSING UNITS – MINIMUM EFFICIENCY REQUIREMENTS

Equipment Type	Size Category	Efficiency ^{a, b}		Test Procedure ^c
		Before 1/1/2016	After 1/1/2016	
Air conditioners, air cooled both split system and single package	≥ 65,000 Btu/h and < 135,000 Btu/h	11.2 EER 11.4 IEER	11.2 EER 12.9 IEER	ANSI/AHRI 340/360
	≥ 135,000 Btu/h and < 240,000 Btu/h	11.0 EER 11.2 IEER	11.0 EER 12.4 IEER	ANSI/AHRI 340/360
	≥ 240,000 Btu/h and < 760,000 Btu/h	10.0 EER 10.1 IEER	10.0 EER 11.6 IEER	
	≥ 760,000 Btu/h	9.7 EER 9.8 IEER	9.7 EER 11.2 IEER	
Air conditioners, water cooled	≥ 65,000 Btu/h and < 135,000 Btu/h	12.1 EER 12.3 IEER	12.1 EER 13.9 IEER	ANSI/AHRI 340/360
	≥ 135,000 Btu/h and < 240,000 Btu/h	12.5 EER 12.5 IEER	12.5 EER 13.9 IEER	ANSI/AHRI 340/360
	≥ 240,000 Btu/h and < 760,000 Btu/h	12.4 EER 12.6 IEER	12.4 EER 13.6 IEER	ANSI/AHRI 340/360
	≥ 760,000 Btu/h	12.2 EER 12.4 IEER	12.2 EER 13.5 IEER	ANSI/AHRI 340/360
Air conditioners, evaporatively cooled	≥ 65,000 Btu/h and < 135,000 Btu/h	12.1 EER ^b 12.3 IEER ^b		ANSI/AHRI 340/360
	≥ 135,000 Btu/h and < 240,000 Btu/h	12.0 EER ^b 12.2 IEER ^b		ANSI/AHRI 340/360
	≥ 240,000 Btu/h and < 760,000 Btu/h	11.9 EER ^b 12.1 IEER ^b		ANSI/AHRI 340/360
	≥ 760,000 Btu/h	11.7 EER ^b 11.9 IEER ^b		ANSI/AHRI 340/360
Condensing units, air cooled	≥ 135,000 Btu/h	10.5 EER 11.8 IEER		ANSI/AHRI 365
Condensing units, water cooled	≥ 135,000 Btu/h	13.5 EER 14.0 IEER		
Condensing units, evaporatively cooled	≥ 135,000 Btu/h	13.5 EER 14.0 IEER		
^a IEERs are only applicable to equipment with capacity control as as specified by ANSI/AHRI 340/360 test procedures ^b Deduct 0.2 from the required EERs and IEERs for units with a heating section other than electric resistance heat. ^c Applicable test procedure and reference year are provided under the definitions.				

TABLE 110.2-B UNITARY AND APPLIED HEAT PUMPS, MINIMUM EFFICIENCY REQUIREMENTS

TABLE 110.2-C AIR-COOLED GAS-ENGINE HEAT PUMPS

TABLE 110.2-D WATER CHILLING PACKAGES – MINIMUM EFFICIENCY REQUIREMENTS

TABLE 110.2-E PACKAGED TERMINAL AIR CONDITIONERS AND PACKAGED TERMINAL HEAT PUMPS – MINIMUM EFFICIENCY REQUIREMENTS

TABLE 110.2-F HEAT TRANSFER EQUIPMENT

TABLE 110.2-G PERFORMANCE REQUIREMENTS FOR HEAT REJECTION EQUIPMENT

TABLE 110.2-H ELECTRICALLY OPERATED VARIABLE REFRIGERANT FLOW (VRF) AIR CONDITIONERS MINIMUM EFFICIENCY REQUIREMENTS

TABLE 110.2-I ELECTRICALLY OPERATED VARIABLE REFRIGERANT FLOW AIR-TO-AIR AND APPLIED HEAT PUMPS - MINIMUM EFFICIENCY REQUIREMENTS

TABLE 110.2-J WARM-AIR FURNACES AND COMBINATION WARM-AIR FURNACES/AIR-CONDITIONING UNITS, WARM-AIR DUCT FURNACES, AND UNIT HEATERS

TABLE 110.2-K GAS- AND OIL-FIRED BOILERS, MINIMUM EFFICIENCY REQUIREMENTS

SECTION 120.2 – REQUIRED CONTROLS FOR SPACE-CONDITIONING SYSTEMS

(i) Economizer Fault Detection and Diagnostics (FDD)

All newly installed air-cooled packaged direct expansion units with an air handler mechanical cooling capacity greater than ~~or equal to~~ 54,000 Btu/hr with an installed air economizer shall include a stand alone or integrated Fault Detection and Diagnostics (FDD) system in accordance with Subsections 120.2(i)1 through 120.2(i)8.

SECTION 120.2 – REQUIRED CONTROLS FOR SPACE-CONDITIONING SYSTEMS

(k) Optimum Start/Stop Controls.

Space conditioning systems with DDC to the zone level shall have optimum start/stop controls. The control algorithm shall, as a minimum, be a function of the difference between space temperature and occupied setpoint, the outdoor air temperature, and the amount of time prior to scheduled occupancy. Mass radiant floor slab systems shall incorporate floor temperature onto the optimum start algorithm.

SECTION 140.4 – PRESCRIPTIVE REQUIREMENTS FOR SPACE CONDITIONING SYSTEMS

(n) Mechanical System Shut-off.

Any directly conditioned space with operable wall or roof openings to the outdoors shall be provided with interlock controls that disable or reset the temperature setpoint to 55°F for mechanical heating and disable or reset the temperature setpoint to 90°F for mechanical cooling to that space when any such opening is open for more than 5 minutes.

EXCEPTION 1 to Section 140.4(n): Interlocks are not required on doors with automatic closing devices.

EXCEPTION 2 to Section 140.4(n): Any space without a thermostatic control (thermostat or a space temperature sensor used to control heating or cooling to the space).

CHANGES TO NONRESIDENTIAL APPENDIX NA7 – *Installation And Acceptance Requirements For Nonresidential Buildings And Covered Processes*

13. Acceptance Test Requirements

13.1 New Acceptance Test Requirements for 2016

A. Building Envelope, §110.6:

- No changes.

B. Mechanical Acceptance Tests, §120.5:

- Thermal Energy Storage (TES) Systems (NRCA-MCH-15-A)
 - Incorporates new acceptance criteria.
- Minor clarifications:
 - Outdoor Air (NRCA-MCH-02-A)
 - Supply Water Temperature Reset Controls (NRCA-MCH-09-A)
 - Hydronic System Variable Flow Controls (NRCA-MCH-10-A)
 - Fault Detection & Diagnostics for DX Units (NRCA-MCH-12-A)
 - Automatic Fault Detection & Diagnostic for Air Handling & Zone Terminal Units (NRCA-MCH-13-A)

C. Lighting Controls Acceptance Tests, §130.4:

- New Acceptance Test
 - Institutional Tuning of Lighting Controls (NRCA-LTI-05-A)
- Significant Alterations to Acceptance Tests
 - New sampling allowance for acceptance tests.
 - Changes to the lighting control occupancy sensor maximum time-out period.
 - Changes to the weighted area calculation procedure requirements.
- Minor clarifications:
 - Outdoor Lighting Acceptance Tests (NRCA-LTO-02-A)

D. Covered Process Spaces and Equipment, §120.6:

- New Acceptance Tests
 - Elevator Lighting and Ventilation Controls (NRCA-PRC-12-F)
 - Escalator and Moving Walkway Speed Control (NRCA-PRC-13-F)
- Changes to Acceptance Procedures
 - Commercial Kitchen Exhaust (NRCA-PRC-02-A)
 - Parking Garage Exhaust (NRCA-PRC-03-F)

NA7.3 Roles and Responsibilities

Individuals who perform the field testing and verification work, and provide the information required for completion of the Certificate of Acceptance documentation are not required to be licensed professionals. The person who signs the Certificate of Acceptance document to certify compliance with the acceptance requirements shall be licensed as specified in Standards Section 10-103(a)4.

10-103 – PERMIT, CERTIFICATE, INFORMATIONAL, AND ENFORCEMENT REQUIREMENTS FOR DESIGNERS, INSTALLERS, BUILDERS, MANUFACTURERS, AND SUPPLIERS

4. **Certificate of Acceptance.** For all nonresidential buildings, high-rise residential buildings, and hotels and motels, when designated to allow use of an occupancy group or type regulated by Part 6 the person in charge of the acceptance testing, who is eligible under Division 3 of the Business and Professions Code to accept responsibility for the applicable scope of system design, or construction, or installation of features, materials, components, or manufactured devices regulated by Part 6 or the Appliance Efficiency Regulations (*responsible person*), shall sign and submit all applicable Certificate of Acceptance documentation in accordance with Section 10-103(a)4 and Nonresidential Appendix NA7 to certify conformance with Part 6.

4. Certificate of Acceptance. (continued)

If more than one person has responsibility for the acceptance testing, each person shall sign and submit the Certificate of Acceptance documentation applicable to the portion of the construction or installation, for which they are responsible; alternatively, the person with chief responsibility for the system design, construction or installation, shall sign and submit the Certificate of Acceptance documentation for the entire construction or installation scope of work for the project. Subject to the requirements of Section 10-103(a)4, persons who prepare Certificate of Acceptance documentation (*documentation authors*) shall sign a declaration statement on the documents they prepare to certify the information provided on the documentation is accurate and complete. Persons who perform acceptance test procedures in accordance with the specifications in Reference Joint Appendix NA7, and report the results of the acceptance tests on the Certificate of Acceptance (*field technicians*) shall sign a declaration statement on the documents they submit to certify the information provided on the documentation is true and correct. In accordance with applicable requirements of 10-103(a)4, the signatures provided by responsible persons, field technicians, and documentation authors shall be original signatures on paper documents or electronic signatures on electronic documents conforming to the electronic signature specifications in Reference Joint Appendix JA7.

NA7.3.1 Responsible Person

The Certificate of Acceptance shall be signed by the person who is in charge of the acceptance testing for the scope of work identified on the Certificate of Acceptance. The Responsible Person shall be a licensed professional who is eligible under Division 3 of the Business and Professions code in the applicable classification, to take responsibility for the aspects of the system design, construction, or installation applicable to the scope of work identified on the Certificate of Acceptance. The Responsible Person shall review the information on the Certificate of Acceptance document and sign the document to certify compliance with the acceptance requirements. The Responsible Person shall assume responsibility for the acceptance testing work performed by the Field Technician agent(s) or employee(s), and if necessary shall interview the person who performed the acceptance test work in order to ascertain whether the testing work reported on the Certificate of Acceptance was completed as reported and is consistent with the Responsible Person's expectation. The Responsible Person may also perform the required acceptance testing work, and in that case shall also sign as the Field Technician on the Certificate of Acceptance document.

NA7.3.2 Field Technician

The *Field Technician* is responsible for performing the acceptance test procedures and documenting the results on the Certificate of Acceptance document. The *Field Technician* shall sign the Certificate of Acceptance to certify that the information provided on the Certificate of Acceptance is true and correct.

NA7.3.3 Documentation Author

Documentation Authors who provide administrative support for document preparation for Certificate of Acceptance documentation shall sign a declaration statement on the documents they prepare to certify the information provided on the documentation is accurate and complete.

STATE OF CALIFORNIA
OUTDOOR AIR ACCEPTANCE
CEC-NRCA-MCH-02-A (Revised MM/YY)
CERTIFICATE OF ACCEPTANCE

CALIFORNIA ENERGY COMMISSION
NRCA-MCH-02-A
(Page 2 of 3)

STATE OF CALIFORNIA
OUTDOOR AIR ACCEPTANCE
CEC-NRCA-MCH-02-A (Revised MM/YY)
CERTIFICATE OF ACCEPTANCE
Outdoor Air Acceptance
NRCA-MCH-02-A
(Page 1 of 3)

Project Name:	Enforcement Agency:	Permit Number:
Project Address:	City:	Zip Code:
System Name or Identification/Tag:	System Location or Area Served:	

Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance. Enforcement Agency Use: Checked by/Date

Intent: Verify measured outside airflow reading is within ± 10% of the total required outside airflow. Required for all newly installed HVAC units. Reference MECH-3C (Column H or Column I) or Mechanical Equipment Schedules.

A. Construction Inspection
Note: MCH-02-A can be performed in conjunction with MCH-07-A Supply Fan VFD Acceptance (if applicable) since testing activities overlap.

- Supporting documentation needed to perform test includes:
 - As-built and/or design documents (for example, Mechanical Equipment Schedules, Equipment Start-Up Sheets or Balancing Reports).
 - 2013-2016 Building Energy Efficiency Standards Nonresidential Compliance Manual (NA7.5.1.1 Ventilation Systems: Variable Air Systems At-A-Glance and NA7.5.1.2 Constant Volume Systems Outdoor Air Acceptance At-A-Glance).
 - 2013-2016 Building Energy Efficiency Standards.
- Instrumentation needed to perform test includes:
 - Watch
 - Calibrated means to measure airflow (i.e. hot-wire anemometer, velocity pressure probe, etc.).
 - Method and equipment used: _____
 - Equipment calibration date (must be within one year): _____
- System type (check either VAV or CAV): VAV CAV
 - Check if Variable Air Volume (VAV) and complete the following:
 - Outside airflow is either factory calibrated or field calibrated.
 Check if factory calibrated and attach calibration certification.
 Check if field calibrated and attach calibration results.
 - Damper Control (must be checked):
 Dynamic damper control is being used to control outside air. (This is NOT a fixed minimum position).
 One of the following dynamic controls is being utilized to control outside air (check method used)
 - Outdoor Air CFM Compensation
 - Energy Balance Method
 - Demand Control Ventilation
 - Return Fan Tracking
 - Injection Fan Method
 - Dedicated Minimum Ventilation Damper with Pressure Control
 - Other Active Control, Describe: _____
 - Check if Constant Air Volume (CAV) and verify the following:
 System is designed to provide a fixed minimum OSA when the unit is on.
- Method of delivering outside air to the unit (check one of the following):
 Outside air is ducted to the return air plenum. Confirm that outside air is ducted to either (check one of the following):
 - Within five ft. of the unit.
 - Within 15 ft of the unit, with the air directed substantially toward the unit. Return air plenum is NOT used to distribute outside air to the unit. i.e. outside air is ducted directly to the unit or outside air is provided independent of the unit.

- Pre-occupancy purge has been programmed for the 1-hour period immediately before the building is normally occupied to provide (one of the following methods must be verified and checked):
- The conditioned floor area times the ventilation rate from the 2013-2016 Building Energy Efficiency Standards TABLE 120.1-A, or 15 cfm per person times the expected number of occupants, whichever is less.
- 3 complete air changes to the zone served by the air handler.

Enforcement Agency: _____ Permit Number: _____
City: _____ Zip Code: _____
System Location or Area Served: _____

ing	<input type="checkbox"/> CAV	<input type="checkbox"/> VAV
conomizer disabled).	<input type="checkbox"/>	<input type="checkbox"/>
m airflow at full		Hz
n /, or Mechanical		cfm
ly airflow is achieved		cfm
		min
m zone airflows, full heating, or 30% of the	<input type="checkbox"/> CAV	<input type="checkbox"/> VAV
		Hz
		cfm
n /, or mechanical equipment schedules).		cfm
supply airflow is achieved (minutes):		min
	<input type="checkbox"/>	<input type="checkbox"/>

for Step 3		%	%
Outdoor airflow (Step 3b/Step 3c)		Y / N	Y / N
10%		Y / N	Y / N
is (Step 3d < 5 minutes)			Y / N
DA _{out} for Step 4 (VAV only)			%
Outdoor airflow reading (Step 1b/Step 1c)			Y / N
0%			Y / N
is (Step 4d < 5 minutes)			Y / N
rs provide the minimum amount of OSA and 2) VAV air handlers use dynamic			

lete and Testing Calculations & Results responses are positive

ential Compliance <Date>

Enforcement Agency: _____ Permit Number: _____
City: _____ Zip Code: _____
System Location or Area Served: _____

tion is accurate and complete.
Documentation Author Signature: _____
Date Signed: _____
ATT Certification Identification (if applicable): _____
Phone: _____

ws of the State of California:
nce is true and correct.
ation reported on this Certificate of Acceptance (Field Technician).
ficate of Acceptance complies with the applicable acceptance requirements
he enforcement agency, and conforms to the applicable acceptance
onresidential Appendix NA7.
or the construction or installation identified on this Certificate of Acceptance has
/installer and has been posted or made available with the building permit(s)

Field Technician Signature: _____
Position with Company (Title): _____
ATT Certification Identification (if applicable): _____
Phone: _____ Date Signed: _____

ws of the State of California:
ing on my behalf as my employee or my agent and I have reviewed the
ssions Code in the applicable classification to accept responsibility for the
materials, components, or manufactured devices for the scope of work
to the declarations in this statement (responsible acceptance person).
nce substantiates that the construction or installation identified on this
e requirements indicated in the plans and specifications approved by the
ceptance requirements and procedures specified in Reference Nonresidential

or the construction or installation identified on this Certificate of Acceptance has
the building permit(s) issued for the building.
ficate of Acceptance shall be posted, or made available with the building
> the enforcement agency for all applicable inspections. I understand that a
d to be included with the documentation the builder provides to the building

Responsible Acceptance Person Signature: _____
Position with Company (Title): _____
CSLB License: _____
Phone: _____ Date Signed: _____

idential Compliance <Date>

NRCA-MCH-02-A User Instructions

This form is used to document results of the minimum outdoor air ventilation tests for both constant and variable air volume fan systems. A separate form should be completed for each system tested. The form is separated into several basic sections: construction inspection; functional testing; testing calculations and results; and pass/fail evaluation. Each section consists of a combination of data entry requirements and check boxes.

Section A. Construction Inspection

This pre-test section consists of check boxes and data entry requirements for both constant and variable air volume systems. Complete only the check boxes associated with the appropriate system type.

Section B. NA7.5.1.1 Outdoor Air Acceptance - Functional Testing

This section consists of check boxes and data entry requirements for both constant and variable air volume systems. Enter data associated with the appropriate system type as instructed.

Section C. Testing Calculations and Results

This section consists of data entry requirements for both constant and variable air volume systems. Enter data associated with the appropriate system type as instructed.

Section D. Evaluation

This section contains check boxes to indicate the pass/fail results of the test(s). Check the appropriate box. Any portion that fails should be explained in the given rows.

Declaration Statements

This section contains fillable fields for three declaration statements: one from the Documentation Author, one from the Field Technician, and one from the Responsible Person. Each area contains a combination of check boxes and data entry requirements, including signature; date; and license number. Complete check boxes and enter data as instructed.

The Documentation Author is the person completing the form. The Field Technician is responsible for performing and documenting the results of the acceptance procedures on the Certificate of Acceptance forms. The Field Technician must sign the Certificate of Acceptance to certify that the information he or she provides on the Certificate of Acceptance is true and correct. It is important to note that the Field Technician is not required to have a contractor's, architect's or engineer's license. A Responsible Person is eligible under Division 3 of the Business and Professions code in the applicable classification to take responsibility for the scope of work specified by the Certificate of Acceptance document. The Responsible Person can also perform the field testing and verification work, and 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 form. The Responsible Person assumes responsibility for the acceptance testing work performed by the Field Technician agent or employee.

STATE OF CALIFORNIA
AIR ECONOMIZER CONTROLS ACCEPTANCE

CEC-NRCA-MCH-05-A (Revised MM/YY)

CALIFORNIA ENERGY COMMISSION

NRCA-MCH-05-A



CERTIFICATE OF ACCEPTANCE

Air Economizer Controls Acceptance

Project Name:

Project Address:

System Name or Identification/Tag:

Note: Submit one Certificate of Acceptance demonstrate compliance.

A. Construction Inspection

1. Supporting documentation needed
 - a. ~~2014~~ **2016** Building Energy Efficiency Standards (A-Glance).
 - b. ~~2014~~ **2016** Building Energy Efficiency Standards (A-Glance).
2. Instrumentation to perform test
 - a. Hand-held temperature probe
Calibration Date: _____
 - b. Device capable of calculating
Calibration Date: _____
 - c. 1.2 kOhm Resistor (when specified)
3. Installation: (all of the following b)
 - Economizer high limit setpoint Section 140.4(e)3.
 - Economizer reliability features
 - a. 5-year manufacturer warranty
 - b. Provide a product manual
 - c. Provide a product manual in w.g. -A per AMCA Stand requirement
 - d. If the high limit setpoint
 - e. Outdoor air, return air
 - i. Drybulb
 - ii. Enthalpy
 - iii. Relative humidity
 - f. Check that the sensor calibration is correct
 - g. Sensors used for economizer control are shielded from direct sunlight
 - Unitary systems with air conditioning compressors off when economizer is in cooling mode.
 - System has return fan in economizer mode.
 - For systems with DDC control
 - For systems with non-DDC control

CA Building Energy Efficiency Standards

STATE OF CALIFORNIA
AIR ECONOMIZER CONTROLS ACCEPTANCE

CEC-NRCA-MCH-05-A (Revised MM/YY)

CALIFORNIA ENERGY COMMISSION

NRCA-MCH-05-A



CERTIFICATE OF ACCEPTANCE

Air Economizer Controls Acceptance

(Page 2 of 3)

Project Name:	Enforcement Agency:	Permit Number:
Project Address:	City:	Zip Code:
System Name or Identification/Tag:	System Location or Area Served:	

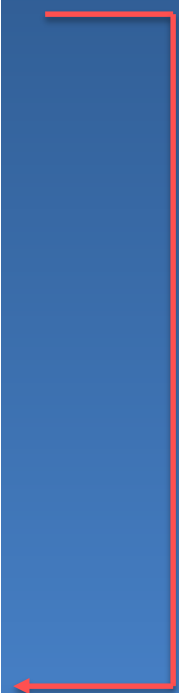
B. Functional Testing	Results
Is the economizer listed in the CEC equipment certification directory? <i>(if yes, proceed to Section D.)</i>	Y / N
Step 1: Disable demand control ventilation systems (if applicable)	
Step 2: Enable the economizer and simulate a cooling demand large enough to drive the economizer fully open. Verify the following:	
a. Economizer damper modulates 100% open.	Y / N
b. Return air damper modulates 100% closed.	Y / N
c. For systems that meet the criteria of 2014 2016 Building Energy Efficiency Standards Section 140.4(e)1, verify that the economizer remains 100% open with the use of mechanical cooling. -This occurs when the cooling demand can no longer be met by the economizer alone.	Y / N
d. All applicable fans and dampers operate as intended to maintain building pressure.	Y / N
e. The unit heating is disabled (if applicable).	Y / N / NA
Step 3: Disable the economizer and simulate a cooling demand. Verify the following:	
a. Economizer damper closes to its minimum position.	Y / N
b. All applicable fans and dampers operate as intended to maintain building pressure.	Y / N
c. The unit heating is disabled (if applicable).	Y / N / NA
Step 4: If the unit is equipped with heating, simulate a heating demand and enable the economizer. Verify the following:	
a. Economizer damper closes to its minimum position.	Y / N / NA
b. Return air damper opens.	Y / N / NA
Step 5: Turn off the unit and verify the following:	
a. Economizer damper closes completely.	Y / N
Step 6: System returned to initial operating conditions	Y / N

C. Testing Results	PASS / FAIL
Step 2: Simulate cooling load and enable the economizer (all answers are Y).	
Step 3: Simulate cooling load and disable the economizer (all answers are Y).	
Step 4: Simulate heating demand and enable the economizer (all answers are Y).	
Step 5: Turn off the unit (all answers are Y).	

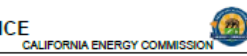
D. Evaluation

PASS: All Construction Inspection responses are complete and all Testing Results responses are "Pass" or the economizer is listed in the CEC equipment certification directory.

Notes:



STATE OF CALIFORNIA
SUPPLY WATER TEMPERATURE RESET CONTROLS ACCEPTANCE
CEC-NRCA-MCH-09-A (Revised MM/YY)



[NRCA-MCH-09-A User Instructions](#)

STATE OF CALIFORNIA
SUPPLY WATER TEMPERATURE RESET CONTROLS ACCEPTANCE
CEC-NRCA-MCH-09-A (Revised MM/YY)

CALIFORNIA ENERGY COMMISSION
NRCA-MCH-09-A
(Page 1 of 3)

Project Name:	Enforcement Agency:	Permit Number:
Project Address:	City:	Zip Code:
System Name or Identification/Tag:	System Location or Area Served:	

Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.

Enforcement Agency Use: Checked by/Date

Intent: Ensure that both the chilled water and hot water supply temperatures are automatically reset based on either building loads or outdoor air temperature, as indicated in the control sequences.

A. Construction Inspection

1. Supporting documentation needed to perform test includes, but not limited to:

a. ~~2013~~ **2016** Building Energy Efficiency Standards Nonresidential Compliance Manual (NA7.5.8 Supply Water Temperature Reset Controls Acceptance At-A-Glance)

2. Instrumentation to perform test includes, but is not limited to:

a. Calibrated reference temperature sensor, icewater, or drywell bath.

1. Calibration Date: _____ (must be within last year).

3. Document that hydronic system supply temperature sensor(s) have been factory or field calibrated: (check the following that apply):

Factory calibrated

Provide supporting documentation.

Field-calibrated by Controls contractor or other.

Calibration complete, hydronic system supply temperature sensors within 1% of calibrated reference sensor, icewater or drywell bath.

Provide supporting documentation.

B. Functional Testing	Results
Step 1: Test Maximum Reset Value	
a. Change reset control variable to its maximum value. This can be accomplished by any one of the following (check method):	<input type="checkbox"/>
<input type="checkbox"/> Commanding at least one coil valve to 100% open	
<input type="checkbox"/> Adjust discharge air temperature or zone temperature setpoints to drive a valve into a 100% open.	
<input type="checkbox"/> Override actual outdoor air sensor to exceed maximum water temperature boundary value.	
b. Verify that chilled or hot water temperature setpoint is reset to appropriate value.	Y / N
c. Verify that actual system temperature changes to within 2% of the new setpoint.	Y / N
Step 2: Test Minimum Reset Value	
a. Change reset control variable to its minimum value	<input type="checkbox"/>
b. Verify that chilled or hot water temperature setpoint is reset to appropriate value	Y / N
c. Verify that actual system temperature changes to within 2% of the new setpoint	Y / N
Step 3: Test Automatic Control of Reset Control Variable.	
a. Restore reset control variable to automatic control	<input type="checkbox"/>
b. Verify that chilled or hot water temperature setpoint is reset to appropriate value	Y / N
c. Verify that actual supply temperature changes to meet setpoint	Y / N
d. Verify that actual supply temperature changes to within 2% of the new setpoint	Y / N

C. Testing Results	PASS / FAIL
System passes criteria in 1c, 2c and 3d	<input type="checkbox"/> <input type="checkbox"/>

NRCA-MCH-09-A
(Page 2 of 3)

Enforcement Agency:	Permit Number:
City:	Zip Code:
System Location or Area Served:	

are complete and all Testing Results responses are "Pass"

[check boxes and data entry requirements. Complete check boxes and enter data](#)

[xes and yes or no questions arranged by individual test. Check each box or circle ific test or line item.](#)

[xes for each test procedure. Complete check boxes as instructed.](#)

[ructed.](#)

[is for three declaration statements: one from the Documentation Author, one me from the Responsible Person. Each area contains a combination of check nts, including signature, date, and license number. Complete check boxes and](#)

[e person completing the form. The Field Technician is responsible for performing the acceptance procedures on the Certificate of Acceptance forms. The Field ate of Acceptance to certify that the information he or she provides on the and correct. It is important to note that the Field Technician is not required to r engineer's license. A Responsible Person is eligible under Division 3 of the y the applicable classification to take responsibility for the scope of work ceptance document. The Responsible Person can also perform the field testing is the case the Responsible Person must complete and sign both the Field the Responsible Person's signature block on the Certificate of Acceptance form, s responsibility for the acceptance testing work performed by the Field](#)

residential Compliance <Date>

nonresidential Compliance <Date>

STATE OF CALIFORNIA HYDRONIC SYSTEM VARIABLE FLOW CONTROL ACCEPTANCE		CALIFORNIA ENERGY COMMISSION
CEC-NRCA-MCH-10-A (Revised MM/YY)		NRCA-MCH-10-A
CERTIFICATE OF ACCEPTANCE		(Page 1 of 3)
Hydronic System Variable Flow Control Acceptance		
Project Name:	Enforcement Agency:	Permit Number:
Project Address:	City:	Zip Code:
System Name or Identification/Tag:	System Location or Area Served:	
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.		Enforcement Agency Use: Checked by/Date
Intent: Ensure that hydronic pump speed varies with building heating and cooling loads.		
A. Construction Inspection		
1. Supporting documentation needed to perform test includes, but not limited to:		
a. As-built and/or Design Documents including Mechanical Equipment Schedules.		
b. 2013 2016 Building Energy Efficiency Standards Nonresidential Compliance Manual (NA7.5.9 Hydronic System Variable Flow Control Acceptance At-A-Glance).		
c. 2013 2016 Building Energy Efficiency Standards.		
2. Instrumentation to perform test includes, but not limited to:		
a. Calibrated differential pressure gauge (hydronic manometer)		
3. Installation:		
<input type="checkbox"/> Pressure sensor location, setpoint, and reset control meets the requirements of 2013 2016 Building Energy Efficiency Standards section 140.4(j) 6B.		
<input type="checkbox"/> For systems without direct digital control of individual coils reporting to the central control panel, differential pressure is measured at or near the most remote heat exchanger or the heat exchanger requiring the greatest differential pressure.		
<input type="checkbox"/> For systems with direct digital control of individual coils with central control panel, the static pressure set point is reset based on the valve requiring the most pressure, and the setpoint is no less than 80% open.		
<input type="checkbox"/> Exception taken. -(Heating hot water system or Condenser water system serving only water-cooled chillers).		
4. Document that all control pressure sensors are factory or field calibrated (check one of the following):		
<input type="checkbox"/> Factory calibrated		
<input type="checkbox"/> Provide supporting documentation		
<input type="checkbox"/> Field calibrated by Controls contractor or other.		
<input type="checkbox"/> Calibration complete. -All pressure sensors ±10% of calibrated reference sensor. -(Provide supporting documentation).		
B. Functional Testing		Results
Step 1: Minimum / Low flow test		
a. Close coil control valves to achieve a maximum of 50% of design flow		<input type="checkbox"/>
b. Verify that the operating speed decreases		Y / N
c. Verify that the current operating speed has not increased (for all other systems that are not DDC)		Y / N
d. Record the system pressure as measured at the control sensor (either ft. w.c. or psig)	ft w.c.	
	psig	
Note: 2.31 ft w.c. = 1.0 psig		
e. Record the system pressure setpoint (either ft. w.c. or psig)	ft w.c.	
	psig	
f. Is the pressure reading on line 1.d. within 5% of pressure setpoint on line 1.e.?		Y / N
g. Did the system operation stabilize within 5 minutes after completion of step 1.a.?		Y / N
Notes:		
CA Building Energy Efficiency Standards - 2013 2016 Nonresidential Compliance		<Date>

CERTIFICATE OF ACCEPTANCE- USER INSTRUCTIONS	NRCA-MCH-10-A
Hydronic System Variable Flow Control Acceptance	(Page 1 of 1)
NRCA-MCH-10-A User Instructions	
Section A. Construction Inspection	
This pre-test section consists of check boxes and data entry requirements. Complete check boxes and enter data as instructed.	
Section B. Functional Testing	
This section consists of check boxes and yes or no questions arranged by individual test. Check each box or circle the correct answer for each specific test or line item.	
Section C. Testing Results	
This section consists of check boxes for each test procedure. Complete check boxes as instructed.	
Section D. Evaluation	
Check the appropriate box as instructed.	
Declaration Statements of Acceptance	
This section contains fillable fields for three declaration statements: one from the Documentation Author, one from the Field Technician, and one from the Responsible Person. Each area contains a combination of check boxes and data entry requirements, including signature; date; and license number. Complete check boxes and enter data as instructed.	
The Documentation Author is the person completing the form. The Field Technician is responsible for performing and documenting the results of the acceptance procedures on the Certificate of Acceptance forms. The Field Technician must sign the Certificate of Acceptance to certify that the information he or she provides on the Certificate of Acceptance is true and correct. It is important to note that the Field Technician is not required to have a contractor's, architect's or engineer's license. A Responsible Person is eligible under Division 3 of the Business and Professions code in the applicable classification to take responsibility for the scope of work specified by the Certificate of Acceptance document. The Responsible Person can also perform the field testing and verification work, and 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 form. The Responsible Person assumes responsibility for the acceptance testing work performed by the Field Technician agent or employee.	
CA Building Energy Efficiency Standards - 2013 2016 Nonresidential Compliance	
<Date>	

STATE OF CALIFORNIA
FAULT DETECTION AND DIAGNOSTICS FOR PACKAGED DIRECT EXPANSION UNITS
CALIFORNIA ENERGY COMMISSION

STATE OF CALIFORNIA
FAULT DETECTION AND DIAGNOSTICS FOR PACKAGED DIRECT EXPANSION UNITS
CEC-NRCA-MCH-12-A (Revised MM/YY) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF ACCEPTANCE		NRCA-MCH-12-A
Fault Detection and Diagnostics (FDD) for Packaged Direct Expansion Units (Page 1 of 3)		
Project Name:	Enforcement Agency:	Permit Number:
Project Address:	City:	Zip Code:
System Name or Identification/Tag:	System Location or Area Served:	

Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance. Enforcement Agency Use: Checked by/Date

A. Construction Inspection

1. Prior to functional testing, verify and document the following:

- The Fault Detection and Diagnostics (FDD) hardware is installed on the unit.
- The FDD system is certified to the California Energy Commission.

2. The following air temperature sensors are permanently installed:

- Outside Air Sensor
- Supply Air Sensor
- Return Air Sensor (applicable for differential economizer operation only)

B. Functional Testing

Air Temperature Sensor Failure/Fault

Step 1: Verify the FDD system indicates normal operation

Step 2: Disconnect outside air temperature sensor from unit controller. Verify the following:

- FDD system reports a fault

Step 3: Connect outside air temperature sensor to unit controller. Verify the following:

- FDD system indicates normal operation

Excess Outside Air

Step 1: Coordinate this test with NRCA-MCH-02-A (NA 7.5.1 Outdoor Air), if NRCA-MCH-02-A indicates "pass" then verify the following:

- FDD system indicates normal operation

Economizer Operation

Step 1: Coordinate this test with NRCA-MCH-05-A (NA 7.5.4 Air Economizer Controls), and simulate failure by immobilizing the outdoor air economizer damper by disconnecting the control signal from the damper actuator (or another method specified by the manufacturer). Verify the following:

- FDD system reports a fault

Step 2: Successfully complete and pass NRCA-MCH-05-A and verify the following:

- FDD system reports normal operation

C. Testing Results	PASS / FAIL
Test passes if all boxes are checked under Functional Testing.	<input type="checkbox"/> <input type="checkbox"/>

NRCA-MCH-12-A
(Page 2 of 3)

Expansion Units

Enforcement Agency: Permit Number:

City: Zip Code:

System Location or Area Served:

Testing Results is "Pass"

NRCA-MCH-12-A User Instructions

boxes and data entry requirements. Complete check boxes and enter data

nd yes or no questions arranged by individual test. Check each box or circle list or line item.

ir each test procedure. Complete check boxes as instructed.

ed.

three declaration statements: one from the Documentation Author, one from the Responsible Person. Each area contains a combination of check including signature; date; and license number. Complete check boxes and

son completing the form. The Field Technician is responsible for performing acceptance procedures on the Certificate of Acceptance forms. The Field Technician is responsible for certifying that the information he or she provides on the Certificate of Acceptance is correct. It is important to note that the Field Technician is not required to be a Licensed Professional Engineer. A Responsible Person is eligible under Division 3 of the California Business and Professions Code to take responsibility for the scope of work on the Certificate of Acceptance. The Responsible Person can also perform the field testing on the Certificate of Acceptance form. In any case the Responsible Person must complete and sign both the Field Technician's signature block on the Certificate of Acceptance form and the Responsible Person's signature block on the Certificate of Acceptance form.

residential Compliance

<Date>

residential Compliance

<Date>

STATE OF CALIFORNIA
THERMAL ENERGY STORAGE (TES) SYSTEM ACCEPTANCE
CEC-NRCA-MCH-15-A (Revised MM/YY)

CALIFORNIA ENERGY COMMISSION



STATE OF CALIFORNIA
THERMAL ENERGY STORAGE (TES) SYSTEM ACCEPTANCE

CALIFORNIA ENERGY COMMISSION



NRCA-MCH-15-A

(Page 3 of 4)

STATE OF CALIFORNIA
THERMAL ENERGY STORAGE (TES) SYSTEM ACCEPTANCE
CEC-NRCA-MCH-15-A (Revised MM/YY)

CERTIFICATE OF ACCEPTANCE
Thermal Energy Storage (TES) System Acceptance
NRCA-MCH-15-A
(Page 1 of 4)

Project Name:	Enforcement Agency:	Permit Number:
Project Address:	City:	Zip Code:
System Name or Identification/Tag:	System Location or Area Served:	

Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance. Enforcement Agency Use: Checked by/Date

Intent: Verify proper operation of distributed energy storage TES systems.

A. Construction Inspection

1. Supporting documentation needed to perform test includes:

- Construction documents (plans, drawings, equipment schedule, etc.)
- Approved submittals (for chillers, storage tanks, controls)
- Copy of manufacturers' product literature
- Copy of Title 24 code
- Copy of pertinent appendices to Title 24

B. System Installation Information

The following information for both the chiller and the storage tank(s) shall be provided on the plans to document the key TES System parameters. Information is likely to be found in submittal documents.

1. Chiller(s)

Brand and Model:	
Type (Centrifugal, Reciprocating, etc) and (qty)	
Heat rejection type (air, water, other)	
Charge mode capacity (tons) @ avg. fluid temp.	
Discharge mode capacity (tons) @ temp.	
Discharge mode efficiency (kW/ton or EER) @ design ambient temp.	
Charge mode efficiency @ nighttime design ambient temp. (kW/ton or EER)	
Fluid type and percentage (nameplate)	

NRCA-MCH-15-A
(Page 2 of 4)

Permit Number:
Zip Code:

- Chilled Water
- Brine (or chilled water with additives)
- Eutectic Salt
- Clathrate Hydrate Slurry (CHS)
- Cryogenic
- Other (specify: _____)

	Results
Verifies proper installation of the TES System	
	Y/N
	Y/N
	Y/N
Based on the design documents	Y/N
Information noted	Y/N
Operation noted	Y/N
	Y/N
	Y/N
Chilled mode of operation	Y/N
Approved by an EMS.	<input type="checkbox"/> Pass / <input type="checkbox"/> Fail
(check all that apply):	
Schedule to specify mode of operation	

NRCA-MCH-15-A
(Page 3 of 4)

Permit Number:
Zip Code:

mode of operation below.	Pass	Fail	N/A
Chiller(s) system stores energy. Verify that the TES system	<input type="checkbox"/>	<input type="checkbox"/>	
Thermal storage manufacturer's storage charging is stopped.	<input type="checkbox"/>	<input type="checkbox"/>	
Chiller(s) discharge mode. Verify that chiller(s) is off/secured mode. If chiller(s) and verify that the storage	<input type="checkbox"/>	<input type="checkbox"/>	
Chiller(s) mechanical cooling only chiller(s) is met by the compressor chiller(s) between (am/pm) and chiller(s) load is met by the	<input type="checkbox"/>	<input type="checkbox"/>	
Chiller(s) annually select discharge and chiller(s) the chiller(s) sharing the chiller(s) between (am/pm) and chiller(s) pressor(s) sharing the load.	<input type="checkbox"/>	<input type="checkbox"/>	
Chiller(s) mode and verify that the storage chiller(s) mode of calls for cooling. If chiller(s) and verify that the storage chiller(s) mode of calls for cooling.	<input type="checkbox"/>	<input type="checkbox"/>	
Chiller(s) the system designer, verify chiller(s) mode of calls for cooling. If chiller(s) mode of calls for cooling.	<input type="checkbox"/>	<input type="checkbox"/>	
Chiller(s) mode of calls for cooling. If chiller(s) mode of calls for cooling.	<input type="checkbox"/>	<input type="checkbox"/>	

tests in step 2 pass.

Instructions

requirements. Complete check boxes and enter

arranged by individual test. Check each box or

Complete check boxes as instructed.

Comments: one from the Documentation Author, one person. Each area contains a combination of check box, and license number. Complete check boxes and

Form. The Field Technician is responsible for procedures on the Certificate of Acceptance forms. To certify that the information he or she provides is important to note that the Field Technician is not responsible. A Responsible Person is eligible under Division 24 to take responsibility for the scope of work. The Responsible Person can also perform the acceptance testing work performed by the Responsible Person must complete and sign both the name and signature block on the Certificate of Acceptance.

<Date>

<Date>

<Date>

RECERTIFICATION

Next Steps

1. Download (by double clicking on the image) and save the document to your local folder
2. Complete the 2016 Recertification Statement. The document should be signed electronically. If not, you will need to make a paper copy and rescan the paper copy before emailing it. NEMIC will not accept paper copies of the document.
3. Email the completed document to administrator@attcp.org.

NEMIC
NATIONAL ENERGY MANAGEMENT INSTITUTE COMMITTEE

CALIFORNIA TITLE 24 MECHANICAL ACCEPTANCE TEST TECHNICIAN CERTIFICATION PROVIDER

2016 Mechanical Acceptance Test Employer Recertification Statement

To be recertified as a NEMIC-certified Mechanical Acceptance Test Employer you must complete this form in its entirety, electronically sign and date it and email it to administrator@attcp.org.

By checking this checkbox I hereby acknowledge that I have viewed the NEMIC ATTCP webinar entitled *California 2016 Building Energy Efficiency Standards for Nonresidential Buildings – Notable Changes to the 2013 Version* and am familiar with the requirements of the *California 2016 Building Energy Efficiency Standards* as they pertain to mechanical acceptance testing.

By checking this checkbox I hereby acknowledge that I meet all qualifications and requirements as for initial certification.

PERSONAL INFORMATION

First Name MI Last Name

Home Address

City State ZIP Code

Primary Phone Number Secondary Phone Number

Email

ACCEPTANCE TEST EMPLOYER (ATE) INFORMATION

Employer Name

Employer Address

City State ZIP Code

Primary Phone Number Secondary Phone Number

Fax Number

ATE Certification Number

By signing this document, I certify that all information provided here is true and factual.

Signature Date

Full Name

DN260401

Thank you!