# DOCKETED

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|---|---|
| **Docket Number:** | 13-ATTCP-01 |
| **Project Title:** | Acceptance and Training Certification |
| **TN #:** | 213523-2 |
| **Document Title:** | California 2016 Building Energy Efficiency Standards for Nonresidential Buildings |
| **Description:** | 2016 Updates |
| **Filer:** | Patty Paul |
| **Organization:** | NEMIC |
| **Submitter Role:** | Public |
| **Submission Date:** | 9/8/2016 8:27:00 AM |
| **Docketed Date:** | 9/7/2016 |

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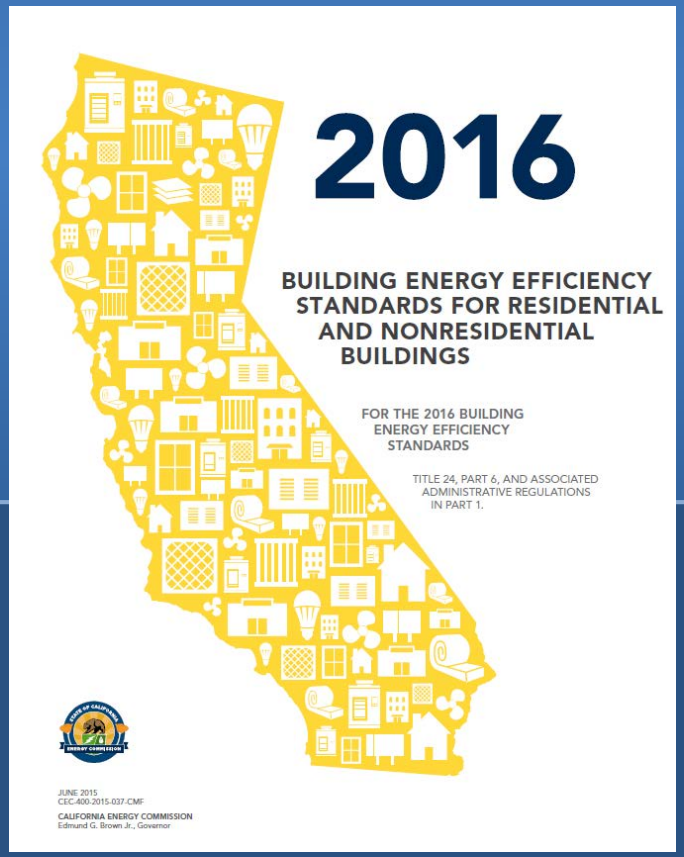


# CALIFORNIA 2016 BUILDING ENERGY EFFICIENCY STANDARDS FOR NONRESIDENTIAL BUILDINGS

2016 Updates

- The purpose of this webinar is to familiarize yourself with the updates to the 2016 Building Energy Efficiency Standards ("Standards"), and in particular, 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 Section §10-103.2(c)3B(vi) *Recertification* as well as by Section 2.3 *Renewal of Certification* of the NEMIC ATTCP Certification Manual. Failure to do so will result in decertification.

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## Overview

- The most significant efficiency improvements to the nonresidential Standards include alignment with the ASHRAE 90.1 2013 national standards.
- New efficiency requirements for 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.

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## 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.

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# 10-103.2 – NONRESIDENTIAL MECHANICAL ACCEPTANCE TEST TRAINING AND CERTIFICATION

- § 10-103.2(c)3F adds the quality assurance requirement for minimum sample sizing for ATTCP audits.
- § 10-103.2(c)3B(iii) removes the requirement for an ATTCP to describe their review process for determining professional experience.
- §10-103.2(d) adds the distinction between Annual Reports and Update Reports.
- §10-103.2(e) removes the expired Interim Approval clauses.
- §10-103.2(f) adds the Amendment Process to provide a process for both substantive and non-substantive changes to an ATTCP application without requiring a new application.

# 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. | | 141.0 |
| | Solar Ready Buildings | 110.10 | N.A. | | 141.0(a) |

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## SECTION 110.2 – MANDATORY REQUIREMENTS FOR SPACECONDITIONING EQUIPMENT

[Note: This update brings the minimum efficiency requirements in alignment with ASHRAE 90.1]

**Certification by Manufacturers**. Any space-conditioning equipment listed in this section may be installed only if the manufacturer has certified to the Commission that the equipment complies with all the applicable requirements of this section.

(a) **Efficiency**. Equipment shall meet the applicable efficiency requirements in TABLE 110.2-A through TABLE 110.2-K subject to the following:

1. If more than one efficiency standard is listed for any equipment in TABLE 110.2-A through TABLE 110.2-K, the equipment shall meet all the applicable standards that are listed; and
2. If more than one test method is listed in TABLE 110.2-A through TABLE 110.2-K, the equipment shall comply with the applicable efficiency standard when tested with each listed test method; and
3. Where equipment serves more than one function, it shall comply with the efficiency standards applicable to each function; and
4. Where a requirement is for equipment rated at its "maximum rated capacity" or "minimum rated capacity," the capacity shall be as provided for and allowed by the controls, during steady-state operation.

- Table 110.2-a Electrically Operated Unitary Air Conditioners And Condensing Units – Minimum Efficiency Requirements
- 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

Nonresidential, high-rise residential, and hotel/motel buildings shall comply with the applicable requirements of Sections 120.2(a) through 120.2(k).

(a) Thermostatic Controls for Each Zone.

(b) Criteria for Zonal Thermostatic Controls.

(c) Hotel/Motel Guest Room and High-rise Residential Dwelling Unit Thermostats.

(d) Heat Pump Controls.

(e) Shut-off and Reset Controls for Space-conditioning Systems.

(f) Dampers for Air Supply and Exhaust Equipment.

(g) Isolation Area Devices.

(h) Automatic Demand Shed Controls

# SECTION 120.2 – REQUIRED CONTROLS FOR SPACE-CONDITIONING SYSTEMS [continued]

**(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 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.

- List of Economizer Fault Detection and Diagnostics Certified to the Energy Commission can be downloaded from http://www.energy.ca.gov/title24/equipment_cert/fdd/

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## SECTION 120.2 – REQUIRED CONTROLS FOR SPACE-CONDITIONING SYSTEMS [continued]

(j) Direct Digital Controls (DDC).

**(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 (NRAC-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)

# NA7.5.1 Outdoor Air: Variable Air and Constant Volume Systems

STATE OF CALIFORNIA

# OUTDOOR AIR ACCEPTANCE

CEC-NRCA-MCH-02-A (Revised MM/YY)

CALIFORNIA ENERGY COMMISSION

| CERTIFICATE OF ACCEPTANCE | | NRCA-MCH-02-A |
|---|---|---|
| Outdoor Air Acceptance | | (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: | |

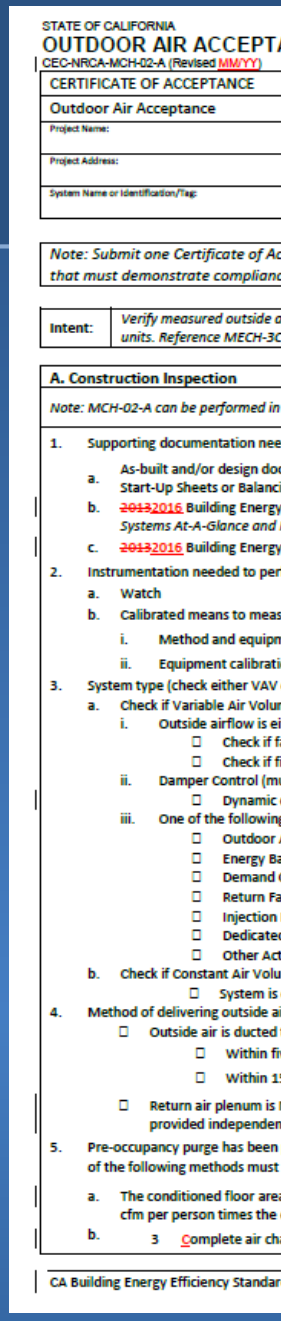
| *Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.* | Enforcement Agency Use: Checked by/Date |
|---|---|

| 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.*

1. Supporting documentation needed to perform test includes:
   a. As-built and/or design documents (for example, Mechanical Equipment Schedules, Equipment Start-Up Sheets or Balancing Reports).
   b. ~~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).*
   c. ~~2013~~2016 Building Energy Efficiency Standards.
2. Instrumentation needed to perform test includes:
   a. Watch
   b. Calibrated means to measure airflow (i.e. hot-wire anemometer, velocity pressure probe, etc.).
      i. Method and equipment used:_____
      ii. Equipment calibration date (must be within one year):_____
3. System type (check either VAV or CAV): ☐ VAV ☐ CAV
   a. Check if Variable Air Volume (VAV) and complete the following:
      i. 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.
      ii. Damper Control (must be checked):
         ☐ Dynamic damper control is being used to control outside air. (This is NOT a fixed minimum position).
      iii. 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: _____
   b. Check if Constant Air Volume (CAV) and verify the following:
      ☐ System is designed to provide a fixed minimum OSA when the unit is on.
4. 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.)
5. 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):
   a. 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.
   b. 3 Complete air changes to the zone served by the air handler.



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OUTDOOR AIR ACCEPT
CEC-NRCA-MCH-02-A (Revised MM/YY)

CERTIFICATE OF ACCEPTANCE
Outdoor Air Acceptance

Project Name:

Project Address:

System Name or Identification/Tag:

*Note: Submit one Certificate of Ac*
*that must demonstrate compliand*

| Intent: | *Verify measured outside a*<br>*units. Reference MECH-3C* |
|---|---|

**A. Construction Inspection**

*Note: MCH-02-A can be performed in*

1. Supporting documentation nee
   - a. As-built and/or design doc
     Start-Up Sheets or Balanci
   - b. ~~2013~~2016 Building Energy
     *Systems At-A-Glance and*
   - c. ~~2013~~2016 Building Energy
2. Instrumentation needed to per
   - a. Watch
   - b. Calibrated means to meas
     - i. Method and equipn
     - ii. Equipment calibrati
3. System type (check either VAV
   - a. Check if Variable Air Volur
     - i. Outside airflow is ei
       - ☐ Check if f
       - ☐ Check if fi
     - ii. Damper Control (m
       - ☐ Dynamic
     - iii. One of the following
       - ☐ Outdoor
       - ☐ Energy Ba
       - ☐ Demand
       - ☐ Return Fa
       - ☐ Injection
       - ☐ Dedicate
       - ☐ Other Act
   - b. Check if Constant Air Volu
     - ☐ System is
4. Method of delivering outside ai
   - ☐ Outside air is ducted
     - ☐ Within fi
     - ☐ Within 1
   - ☐ Return air plenum is
     provided independen
5. Pre-occupancy purge has been
   of the following methods must
   - a. The conditioned floor area
     cfm per person times the
   - b. 3 Complete air cha

CA Building Energy Efficiency Standar

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**OUTDOOR AIR ACCEPTANCE**
CEC-NRCA-MCH-02-A (Revised MM/YY)
CALIFORNIA ENERGY COMMISSION

| CERTIFICATE OF ACCEPTANCE | | NRCA-MCH-02-A |
|---|---|---|
| Outdoor Air 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. NA7.5.1.1 Outdoor Air Acceptance Functional Testing | | ☐ CAV | ☐ VAV |
|---|---|---|---|
| **Step 1: Disable demand control ventilation (if applicable)** | | | |
| **Step 2: Verify unit is not in economizer mode during test (economizer disabled).** | | ☐ | ☐ |
| *Note: Shaded boxes do not apply for CAV systems* | | | |
| **Step 3: CAV and VAV testing at full supply airflow** | | | |
| a. | Adjust supply air to achieve design airflow or maximum airflow at full cooling. -Record VFD speed (Hz). | | Hz |
| b. | Measured outdoor airflow reading (cfm) | cfm | cfm |
| c. | Required outdoor airflow (cfm) *(from MCH-03, Column I, or Mechanical Equipment Schedules).* | cfm | cfm |
| d. | Time for outside air damper to stabilize after full supply airflow is achieved (minutes): | | min |
| **Step 4: VAV testing at reduced supply airflow** | | **CAV** | **VAV** |
| a. | Adjust supply airflow to either the sum of the minimum zone airflows, full heating, or 30% of the total design airflow. -Record VFD speed (Hz). | | Hz |
| b. | Measured outdoor airflow reading (cfm) | | cfm |
| c. | Required outdoor airflow (cfm) *(from MCH-03, Column I, or mechanical equipment schedules).* | | cfm |
| d. | Time for outside air damper to stabilize after reduced supply airflow is achieved (minutes): | | min |
| **Step 5: Return to initial conditions (check)** | | ☐ | ☐ |

| C. Testing Calculations & Results | | | |
|---|---|---|---|
| Determine Percent Outside Air at full supply airflow ($\%OA_{FA}$) for Step 3 | | | |
| a. | $\%OA_{FA}$ = Measured outdoor airflow reading /Required outdoor airflow (Step3b/Step3c) | % | % |
| b. | $\%OA_{FA}$ is within 10% of design Outside Air. ($\%OA_{FA} \leq 110\%$) | Y / N | Y / N |
| c. | Outside air damper position stabilizes within 5 minutes (Step 3d < 5 minutes) | | Y / N |
| Determine Percent Outside Air at reduced supply airflow ($\%OA_{RA}$) for Step 4 (VAV only) | | | |
| a. | $\%OA_{RA}$ = Measured outdoor airflow reading /Required outdoor airflow reading (Step4b/Step4c) | | % |
| b. | $\%OA_{RA}$ is within 10% of design Outside Air. ($OA_{RA} \leq 110\%$) | | Y / N |
| c. | Outside air damper position stabilizes within 5 minutes (Step 4d < 5 minutes) | | Y / N |
| Note: The intent of this test is to ensure that 1) all air handlers provide the minimum amount of OSA and 2) VAV air handlers use dynamic controls to avoid over ventilation. | | | |

| D. Evaluation | |
|---|---|
| ☐ | PASS: All Construction Inspection responses are complete and Testing Calculations & Results responses are positive (Y - yes) |

CA Building Energy Efficiency Standards - ~~2013~~2016 Nonresidential Compliance <Date>

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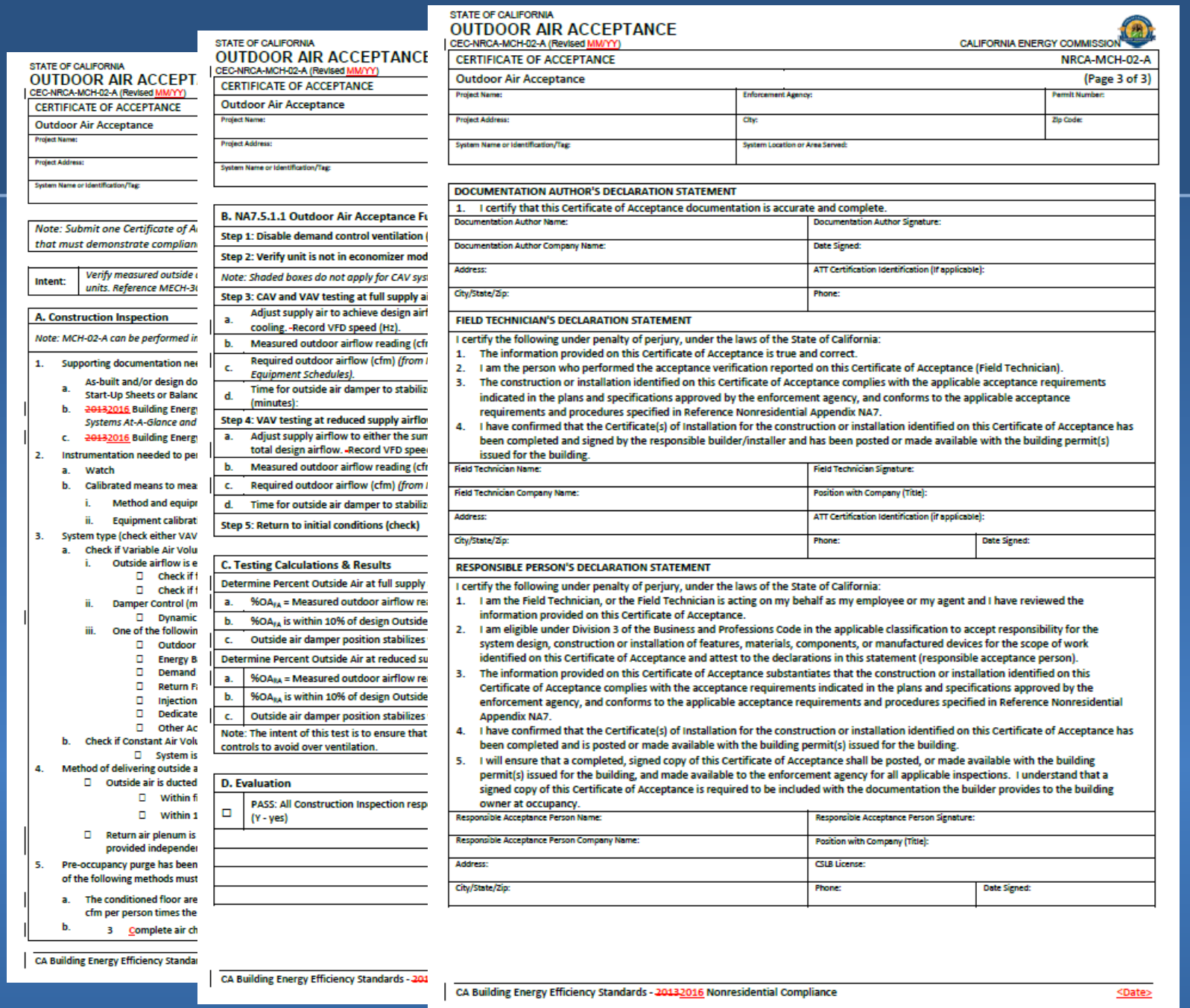

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OUTDOOR AIR ACCEPT
CEC-NRCA-MCH-02-A (Revised MM/YY)
CERTIFICATE OF ACCEPTANCE
Outdoor Air Acceptance
Project Name:
Project Address:
System Name or Identification/Tag:

*Note: Submit one Certificate of A*
*that must demonstrate complian*

| Intent: | *Verify measured outside* *units. Reference MECH-3* |
|---|---|

**A. Construction Inspection**

*Note: MCH-02-A can be performed in*

1. Supporting documentation nee
   a. As-built and/or design do Start-Up Sheets or Balanc
   b. ~~2013~~2016 Building Energ *Systems At-A-Glance and*
   c. ~~2013~~2016 Building Energ
2. Instrumentation needed to per
   a. Watch
   b. Calibrated means to mea
      i. Method and equip
      ii. Equipment calibrat
3. System type (check either VAV
   a. Check if Variable Air Volu
      i. Outside airflow is e
         ☐ Check if f
         ☐ Check if f
      ii. Damper Control (m
         ☐ Dynamic
      iii. One of the followin
         ☐ Outdoor
         ☐ Energy B
         ☐ Demand
         ☐ Return F
         ☐ Injection
         ☐ Dedicate
         ☐ Other Ac
   b. Check if Constant Air Volu
      ☐ System is
4. Method of delivering outside a
   ☐ Outside air is ducted
      ☐ Within fi
      ☐ Within 1
   ☐ Return air plenum is provided independe
5. Pre-occupancy purge has been of the following methods must
   a. The conditioned floor are cfm per person times the
   b. 3 Complete air ch

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STATE OF CALIFORNIA
OUTDOOR AIR ACCEPTANCE
CEC-NRCA-MCH-02-A (Revised MM/YY)
CERTIFICATE OF ACCEPTANCE
Outdoor Air Acceptance
Project Name:
Project Address:
System Name or Identification/Tag:

**B. NA7.5.1.1 Outdoor Air Acceptance Fu**

**Step 1: Disable demand control ventilation (**

**Step 2: Verify unit is not in economizer mod**

*Note: Shaded boxes do not apply for CAV syst*

**Step 3: CAV and VAV testing at full supply ai**

| | |
|---|---|
| a. | Adjust supply air to achieve design airf cooling. -Record VFD speed (Hz). |
| b. | Measured outdoor airflow reading (cfr |
| c. | Required outdoor airflow (cfm) *(from I Equipment Schedules).* |
| d. | Time for outside air damper to stabiliz (minutes): |

**Step 4: VAV testing at reduced supply airflo**

| | |
|---|---|
| a. | Adjust supply airflow to either the sum total design airflow. -Record VFD spee |
| b. | Measured outdoor airflow reading (cfr |
| c. | Required outdoor airflow (cfm) *(from I* |
| d. | Time for outside air damper to stabiliz |

**Step 5: Return to initial conditions (check)**

**C. Testing Calculations & Results**

| | |
|---|---|
| Determine Percent Outside Air at full supply | |
| a. | $\%OA_{VA}$ = Measured outdoor airflow re |
| b. | $\%OA_{VA}$ is within 10% of design Outside |
| c. | Outside air damper position stabilizes |
| Determine Percent Outside Air at reduced su | |
| a. | $\%OA_{RA}$ = Measured outdoor airflow re |
| b. | $\%OA_{RA}$ is within 10% of design Outside |
| c. | Outside air damper position stabilizes |

Note: The intent of this test is to ensure that controls to avoid over ventilation.

**D. Evaluation**

| | |
|---|---|
| ☐ | PASS: All Construction Inspection resp (Y - yes) |

CA Building Energy Efficiency Standards - ~~201~~

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

| CERTIFICATE OF ACCEPTANCE | NRCA-MCH-02-A |
|---|---|
| Outdoor Air Acceptance | (Page 3 of 3) |

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

**DOCUMENTATION AUTHOR'S DECLARATION STATEMENT**

1. I certify that this Certificate of Acceptance documentation is accurate and complete.

| Documentation Author Name: | Documentation Author Signature: |
|---|---|
| Documentation Author Company Name: | Date Signed: |
| Address: | ATT Certification Identification (if applicable): |
| City/State/Zip: | Phone: |

**FIELD TECHNICIAN'S DECLARATION STATEMENT**

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Acceptance is true and correct.
2. I am the person who performed the acceptance verification reported on this Certificate of Acceptance (Field Technician).
3. The construction or installation identified on this Certificate of Acceptance complies with the applicable acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
4. I have confirmed that the Certificate(s) of Installation for the construction or installation identified on this Certificate of Acceptance has been completed and signed by the responsible builder/installer and has been posted or made available with the building permit(s) issued for the building.

| Field Technician Name: | Field Technician Signature: | |
|---|---|---|
| Field Technician Company Name: | Position with Company (Title): | |
| Address: | ATT Certification Identification (if applicable): | |
| City/State/Zip: | Phone: | Date Signed: |

**RESPONSIBLE PERSON'S DECLARATION STATEMENT**

I certify the following under penalty of perjury, under the laws of the State of California:

1. I am the Field Technician, or the Field Technician is acting on my behalf as my employee or my agent and I have reviewed the information provided on this Certificate of Acceptance.
2. I am eligible under Division 3 of the Business and Professions Code in the applicable classification to accept responsibility for the system design, construction or installation of features, materials, components, or manufactured devices for the scope of work identified on this Certificate of Acceptance and attest to the declarations in this statement (responsible acceptance person).
3. The information provided on this Certificate of Acceptance substantiates that the construction or installation identified on this Certificate of Acceptance complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
4. I have confirmed that the Certificate(s) of Installation for the construction or installation identified on this Certificate of Acceptance has been completed and is posted or made available with the building permit(s) issued for the building.
5. I will ensure that a completed, signed copy of this Certificate of Acceptance shall be posted, or made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a signed copy of this Certificate of Acceptance is required to be included with the documentation the builder provides to the building owner at occupancy.

| Responsible Acceptance Person Name: | Responsible Acceptance Person Signature: | |
|---|---|---|
| Responsible Acceptance Person Company Name: | Position with Company (Title): | |
| Address: | CSLB License: | |
| City/State/Zip: | Phone: | Date Signed: |

CA Building Energy Efficiency Standards - ~~2013~~2016 Nonresidential Compliance <Date>

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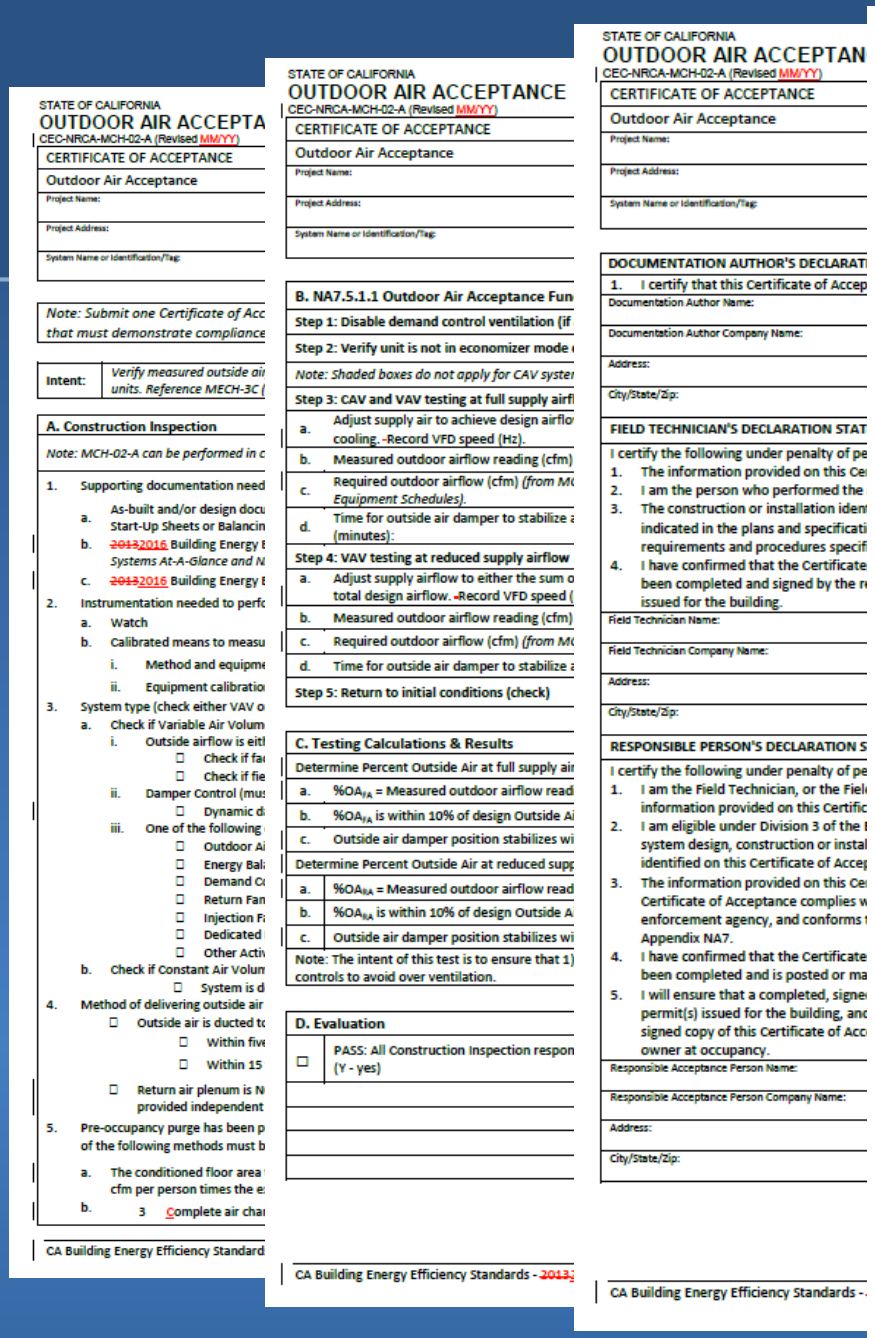
NATIONAL ENERGY MANAGEMENT INSTITUTE COMMITTEE


STATE OF CALIFORNIA
OUTDOOR AIR ACCEPTA
CEC-NRCA-MCH-02-A (Revised MM/YY)
CERTIFICATE OF ACCEPTANCE
Outdoor Air Acceptance
Project Name:
Project Address:
System Name or Identification/Tag:
Note: Submit one Certificate of Acc
that must demonstrate compliance
Intent: Verify measured outside ai
units. Reference MECH-3C (
A. Construction Inspection
Note: MCH-02-A can be performed in c
1. Supporting documentation need
a. As-built and/or design docu
Start-Up Sheets or Balancin
b. 20132016 Building Energy E
Systems At-A-Glance and N
c. 20132016 Building Energy E
2. Instrumentation needed to perfc
a. Watch
b. Calibrated means to measu
i. Method and equipme
ii. Equipment calibratio
3. System type (check either VAV o
a. Check if Variable Air Volum
i. Outside airflow is eitl
☐ Check if fa
☐ Check if fie
ii. Damper Control (mus
☐ Dynamic d
iii. One of the following
☐ Outdoor Ai
☐ Energy Bal
☐ Demand C
☐ Return Fan
☐ Injection F
☐ Dedicated
☐ Other Activ
b. Check if Constant Air Volum
☐ System is d
4. Method of delivering outside air
☐ Outside air is ducted to
☐ Within five
☐ Within 15
☐ Return air plenum is N
provided independent
5. Pre-occupancy purge has been p
of the following methods must b
a. The conditioned floor area
cfm per person times the e
b. 3 Complete air cha
CA Building Energy Efficiency Standard
STATE OF CALIFORNIA
OUTDOOR AIR ACCEPTANCE
CEC-NRCA-MCH-02-A (Revised MM/YY)
CERTIFICATE OF ACCEPTANCE
Outdoor Air Acceptance
Project Name:
Project Address:
System Name or Identification/Tag:
B. NA7.5.1.1 Outdoor Air Acceptance Fun
Step 1: Disable demand control ventilation (if
Step 2: Verify unit is not in economizer mode
Note: Shaded boxes do not apply for CAV syste
Step 3: CAV and VAV testing at full supply airfl
a. Adjust supply air to achieve design airflo
cooling. -Record VFD speed (Hz).
b. Measured outdoor airflow reading (cfm)
c. Required outdoor airflow (cfm) (from MC
Equipment Schedules).
d. Time for outside air damper to stabilize
(minutes):
Step 4: VAV testing at reduced supply airflow
a. Adjust supply airflow to either the sum o
total design airflow. -Record VFD speed (
b. Measured outdoor airflow reading (cfm)
c. Required outdoor airflow (cfm) (from MC
d. Time for outside air damper to stabilize
Step 5: Return to initial conditions (check)
C. Testing Calculations & Results
Determine Percent Outside Air at full supply air
a. $\%OA_{FA}$ = Measured outdoor airflow read
b. $\%OA_{FA}$ is within 10% of design Outside Ai
c. Outside air damper position stabilizes wi
Determine Percent Outside Air at reduced supp
a. $\%OA_{RA}$ = Measured outdoor airflow read
b. $\%OA_{RA}$ is within 10% of design Outside A
c. Outside air damper position stabilizes wi
Note: The intent of this test is to ensure that 1)
controls to avoid over ventilation.
D. Evaluation
☐ PASS: All Construction Inspection respon
(Y - yes)
CA Building Energy Efficiency Standards - 2013
STATE OF CALIFORNIA
OUTDOOR AIR ACCEPTAN
CEC-NRCA-MCH-02-A (Revised MM/YY)
CERTIFICATE OF ACCEPTANCE
Outdoor Air Acceptance
Project Name:
Project Address:
System Name or Identification/Tag:
DOCUMENTATION AUTHOR'S DECLARAT
1. I certify that this Certificate of Accep
Documentation Author Name:
Documentation Author Company Name:
Address:
City/State/Zip:
FIELD TECHNICIAN'S DECLARATION STAT
I certify the following under penalty of pe
1. The information provided on this Ce
2. I am the person who performed the
3. The construction or installation iden
indicated in the plans and specificati
requirements and procedures specif
4. I have confirmed that the Certificate
been completed and signed by the r
issued for the building.
Field Technician Name:
Field Technician Company Name:
Address:
City/State/Zip:
RESPONSIBLE PERSON'S DECLARATION S
I certify the following under penalty of pe
1. I am the Field Technician, or the Fiel
information provided on this Certific
2. I am eligible under Division 3 of the
system design, construction or instal
identified on this Certificate of Accep
3. The information provided on this Ce
Certificate of Acceptance complies w
enforcement agency, and conforms
Appendix NA7.
4. I have confirmed that the Certificate
been completed and is posted or ma
5. I will ensure that a completed, signe
permit(s) issued for the building, and
signed copy of this Certificate of Acc
owner at occupancy.
Responsible Acceptance Person Name:
Responsible Acceptance Person Company Name:
Address:
City/State/Zip:
CA Building Energy Efficiency Standards -

CERTIFICATE OF ACCEPTANCE– USER INSTRUCTIONS | NRCA-MCH-02-A
Outdoor Air Acceptance | (Page 1 of 1)

## 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.

CA Building Energy Efficiency Standards - 20132016 Nonresidential Compliance <Date>

# NA7.5.4 Air Economizer Controls Acceptance

NEMIC
NATIONAL ENERGY MANAGEMENT INSTITUTE COMMITTEE

STATE OF CALIFORNIA
# AIR ECONOMIZER CONTROLS ACCEPTANCE
CEC-NRCA-MCH-05-A (Revised MM/YY)

CALIFORNIA ENERGY COMMISSION

| CERTIFICATE OF ACCEPTANCE | | NRCA-MCH-05-A |
|---|---|---|
| Air Economizer Controls Acceptance | | (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. Supporting documentation needed to perform test includes:
   a. ~~2013~~2016 Building Energy Efficiency Standards Nonresidential Compliance Manual *(NA7.5.4 Air Economizer Controls Acceptance At-A-Glance)*.
   b. ~~2013~~2016 Building Energy Efficiency Standards.

2. Instrumentation to perform test includes:
   a. Hand-held temperature probe
      Calibration Date: _____(must be within last year)
   b. Device capable of calculating enthalpy
      Calibration Date: _____(must be within last year)
   c. 1.2 kOhm Resistor ( when specified by the manufacturer)

3. Installation: (all of the following boxes should be checked)

   ☐ Economizer high limit shutoff control complies with Table 140.4-B found in the ~~2013~~2016 Building Energy Efficiency Standards Section 140.4(e)3.

   ☐ Economizer reliability features are present per ~~2013~~2016 Building Energy Efficiency Standards Section 140.4(e)4:
      a. 5-year manufacturer warranty of economizer assembly
      b. Provide a product specification sheet proving capability of at least 60,000 actuations
      c. Provide a product specification sheet proving compliance with AMCA Standard 500 damper leakage at 10 cfm/~~sf~~ft$^2$ at 1.0 in w.g. ~~A~~ product specification sheet showing the manufacturer's results after following the testing procedures of AMCA Standard 500 or AMCA certification by a third party under AMCA Publication 511 can be used to satisfy this requirement (Class 1A, 1, and 2 are acceptable).
      d. If the high limit setpoint is fixed dry-bulb or fixed enthalpy + fixed dry-bulb then the control shall have an adjustable setpoint
      e. Outdoor air, return air, mixed air, and supply air sensors shall be calibrated as follows:
         i. Drybulb and wetbulb temperatures accurate to ±2°F over the range of 40°F to 80°F
         ii. Enthalpy accurate to ±3 Btu/lb over the range of 20 Btu/lb to 36 Btu/lb
         iii. Relative humidity (RH) accurate to ±5% over the range of 20% to 80% RH
      f. Check that the sensor performance curve(s) is provided by the factory and sensor output values measured during sensor calibration are plotted on the performance curve(s)
      g. Sensors used for high limit control shall be located to prevent false readings, including but not limited to being properly shielded from direct sunlight.

   ☐ Unitary systems with an economizer have control systems, including two-stage or electronic thermostats, that cycle compressors off when economizers can provide partial cooling

   ☐ System has return fan speed control, relief dampers, or dedicated relief fans to prevent building over pressurization in full economizer mode.

   ☐ For systems with DDC controls, sensor used for economizer lockout has been factory or field calibrated.

   ☐ For systems with non-DDC controls, manufacturer's startup and testing procedures have been applied.

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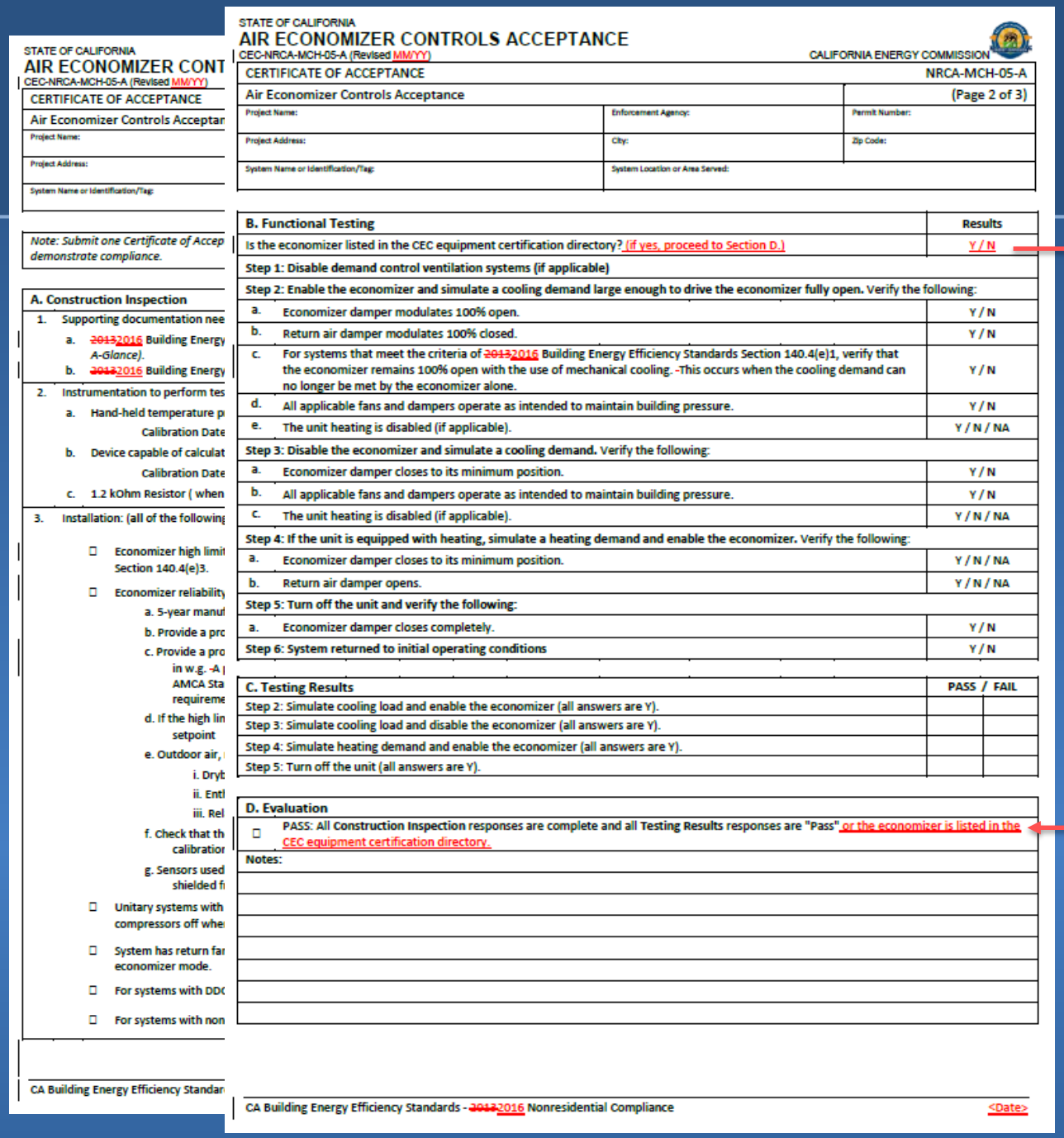

STATE OF CALIFORNIA
AIR ECONOMIZER CONT
CEC-NRCA-MCH-05-A (Revised MM/YY)

CERTIFICATE OF ACCEPTANCE

Air Economizer Controls Acceptar

Project Name:

Project Address:

System Name or Identification/Tag:

*Note: Submit one Certificate of Accep demonstrate compliance.*

**A. Construction Inspection**

1. Supporting documentation nee
   a. ~~2013~~2016 Building Energy *A-Glance).*
   b. ~~2013~~2016 Building Energy
2. Instrumentation to perform tes
   a. Hand-held temperature p
      Calibration Date
   b. Device capable of calculat
      Calibration Date
   c. 1.2 kOhm Resistor ( when
3. Installation: (all of the following
   - ☐ Economizer high limit Section 140.4(e)3.
   - ☐ Economizer reliability
     a. 5-year manuf
     b. Provide a pro
     c. Provide a pro in w.g. -A AMCA Sta requireme
     d. If the high lin setpoint
     e. Outdoor air,
        i. Dryb
        ii. Entl
        iii. Rel
     f. Check that th calibratior
     g. Sensors used shielded fi
   - ☐ Unitary systems with compressors off whe
   - ☐ System has return fa economizer mode.
   - ☐ For systems with DD
   - ☐ For systems with non

CA Building Energy Efficiency Standar

STATE OF CALIFORNIA
**AIR ECONOMIZER CONTROLS ACCEPTANCE**
CEC-NRCA-MCH-05-A (Revised MM/YY) CALIFORNIA ENERGY COMMISSION

| CERTIFICATE OF ACCEPTANCE | | NRCA-MCH-05-A |
|---|---|---|
| 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? (if yes, proceed to Section D.) | | 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 ~~2013~~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:**

CA Building Energy Efficiency Standards - ~~2013~~2016 Nonresidential Compliance <Date>

# NA7.5.8 Supply Water Temperature Reset Controls Acceptance

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NATIONAL ENERGY MANAGEMENT INSTITUTE COMMITTEE

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

| CERTIFICATE OF ACCEPTANCE | | NRCA-MCH-09-A |
|---|---|---|
| Supply Water Temperature Controls Acceptance | | (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): | ☐ |
| ☐ Commanding at least one coil valve to 100% open | |
| ☐ Adjust discharge air temperature or zone temperature setpoints to drive a valve into a 100% open. | |
| ☐ 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 | ☐ |
| 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 | ☐ |
| 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 | ☐ | ☐ |

CA Building Energy Efficiency Standards - ~~2013~~2016 Nonresidential Compliance <Date>

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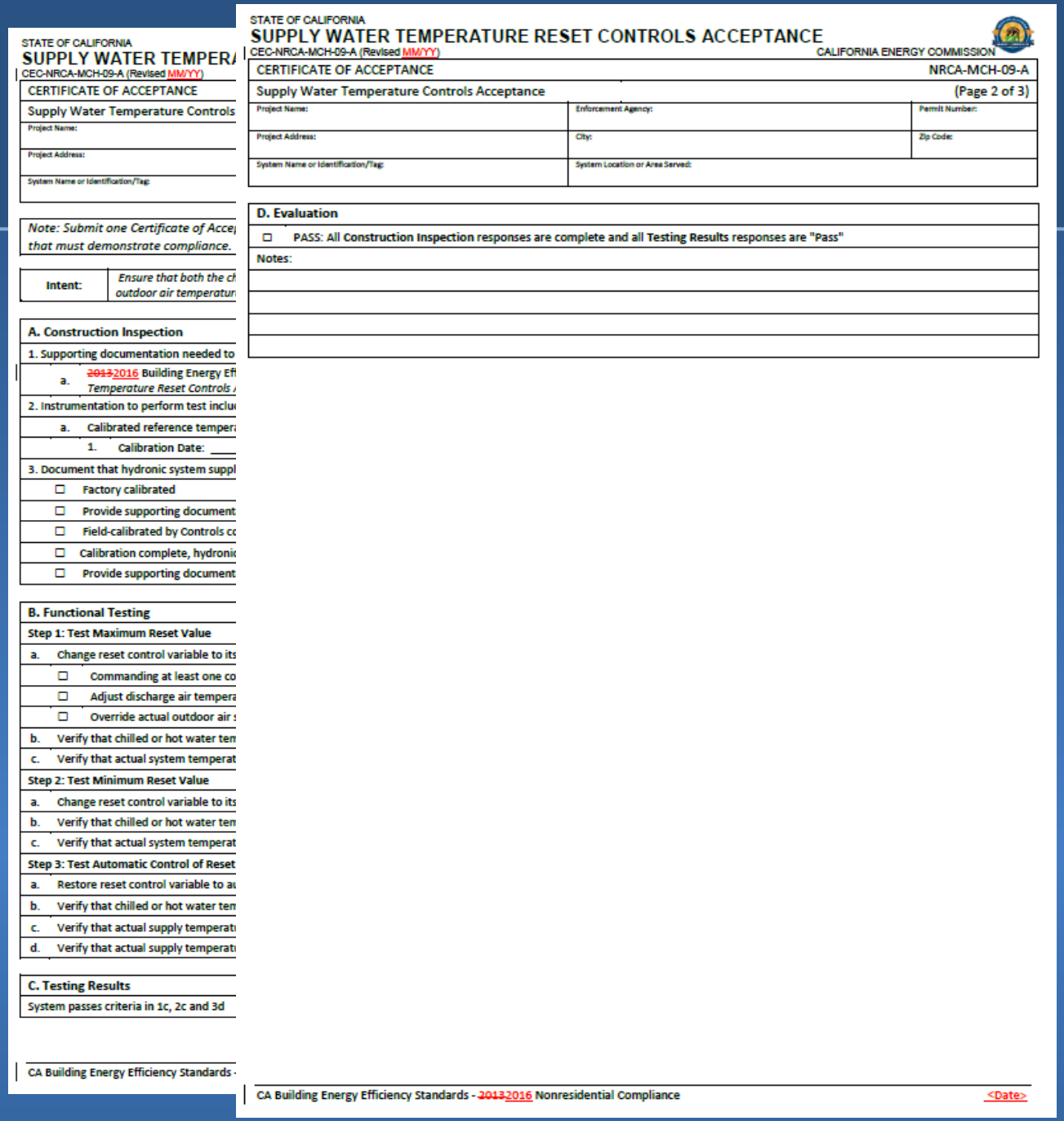


STATE OF CALIFORNIA
SUPPLY WATER TEMPERA
CEC-NRCA-MCH-09-A (Revised MM/YY)
CERTIFICATE OF ACCEPTANCE
Supply Water Temperature Controls
Project Name:
Project Address:
System Name or Identification/Tag:

*Note: Submit one Certificate of Acce*
*that must demonstrate compliance.*

| Intent: | *Ensure that both the ch* *outdoor air temperatur* |
|---|---|

**A. Construction Inspection**

1. Supporting documentation needed to
   a. ~~2013~~2016 Building Energy Eff *Temperature Reset Controls*
2. Instrumentation to perform test inclu
   a. Calibrated reference temper
      1. Calibration Date: ____
3. Document that hydronic system suppl
   - ☐ Factory calibrated
   - ☐ Provide supporting document
   - ☐ Field-calibrated by Controls co
   - ☐ Calibration complete, hydronic
   - ☐ Provide supporting document

**B. Functional Testing**

**Step 1: Test Maximum Reset Value**

a. Change reset control variable to its
   - ☐ Commanding at least one co
   - ☐ Adjust discharge air tempera
   - ☐ Override actual outdoor air s

b. Verify that chilled or hot water ter
c. Verify that actual system temperat

**Step 2: Test Minimum Reset Value**

a. Change reset control variable to its
b. Verify that chilled or hot water ter
c. Verify that actual system temperat

**Step 3: Test Automatic Control of Reset**

a. Restore reset control variable to au
b. Verify that chilled or hot water ter
c. Verify that actual supply temperatu
d. Verify that actual supply temperatu

**C. Testing Results**

System passes criteria in 1c, 2c and 3d

CA Building Energy Efficiency Standards -

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

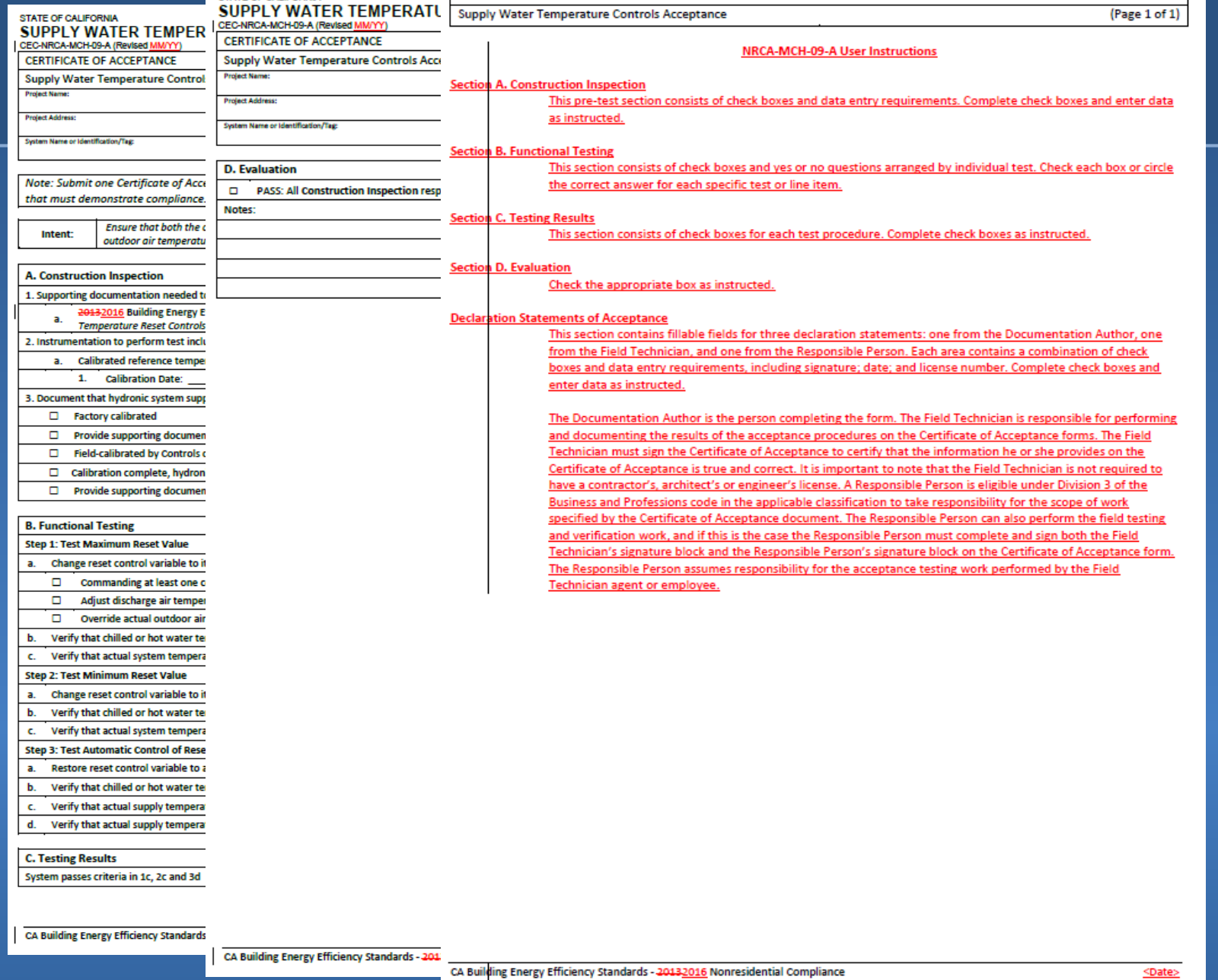
| CERTIFICATE OF ACCEPTANCE | | NRCA-MCH-09-A |
|---|---|---|
| Supply Water Temperature Controls Acceptance | | (Page 2 of 3) |
| Project Name: | Enforcement Agency: | Permit Number: |
| Project Address: | City: | Zip Code: |
| System Name or Identification/Tag: | System Location or Area Served: | |

**D. Evaluation**

☐ PASS: All **Construction Inspection** responses are complete and all **Testing Results** responses are "Pass"

Notes:

CA Building Energy Efficiency Standards - ~~2013~~2016 Nonresidential Compliance <Date>



STATE OF CALIFORNIA
SUPPLY WATER TEMPER
CEC-NRCA-MCH-09-A (Revised MM/YY)

CERTIFICATE OF ACCEPTANCE

Supply Water Temperature Control

Project Name:

Project Address:

System Name or Identification/Tag:

*Note: Submit one Certificate of Acc*
*that must demonstrate compliance.*

| Intent: | *Ensure that both the c*<br>*outdoor air temperatu* |
|---|---|

**A. Construction Inspection**

1. Supporting documentation needed t
   a. ~~2013~~2016 Building Energy E
   *Temperature Reset Controls*
2. Instrumentation to perform test incl
   a. Calibrated reference tempe
      1. Calibration Date: ___
3. Document that hydronic system supp
   - ☐ Factory calibrated
   - ☐ Provide supporting documen
   - ☐ Field-calibrated by Controls c
   - ☐ Calibration complete, hydron
   - ☐ Provide supporting documen

**B. Functional Testing**

**Step 1: Test Maximum Reset Value**

a. Change reset control variable to it
   - ☐ Commanding at least one c
   - ☐ Adjust discharge air tempe
   - ☐ Override actual outdoor air
b. Verify that chilled or hot water te
c. Verify that actual system tempera

**Step 2: Test Minimum Reset Value**

a. Change reset control variable to it
b. Verify that chilled or hot water te
c. Verify that actual system tempera

**Step 3: Test Automatic Control of Rese**

a. Restore reset control variable to a
b. Verify that chilled or hot water te
c. Verify that actual supply tempera
d. Verify that actual supply tempera

**C. Testing Results**

System passes criteria in 1c, 2c and 3d

CA Building Energy Efficiency Standards

STATE OF CALIFORNIA
SUPPLY WATER TEMPERATU
CEC-NRCA-MCH-09-A (Revised MM/YY)

CERTIFICATE OF ACCEPTANCE

Supply Water Temperature Controls Acc

Project Name:

Project Address:

System Name or Identification/Tag:

**D. Evaluation**

☐ PASS: All Construction Inspection resp

Notes:

CA Building Energy Efficiency Standards - ~~201~~

| CERTIFICATE OF ACCEPTANCE– USER INSTRUCTIONS | NRCA-MCH-09-A |
|---|---|
| Supply Water Temperature Controls Acceptance | (Page 1 of 1) |

## NRCA-MCH-09-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>

# NA7.5.9 Hydronic System Variable Flow Control Acceptance

NEMIC
NATIONAL ENERGY MANAGEMENT INSTITUTE COMMITTEE

STATE OF CALIFORNIA
# HYDRONIC SYSTEM VARIABLE FLOW CONTROL ACCEPTANCE
CEC-NRCA-MCH-10-A (Revised MM/YY) CALIFORNIA ENERGY COMMISSION

| CERTIFICATE OF ACCEPTANCE | | NRCA-MCH-10-A |
|---|---|---|
| Hydronic System Variable Flow Control Acceptance | | (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: | |

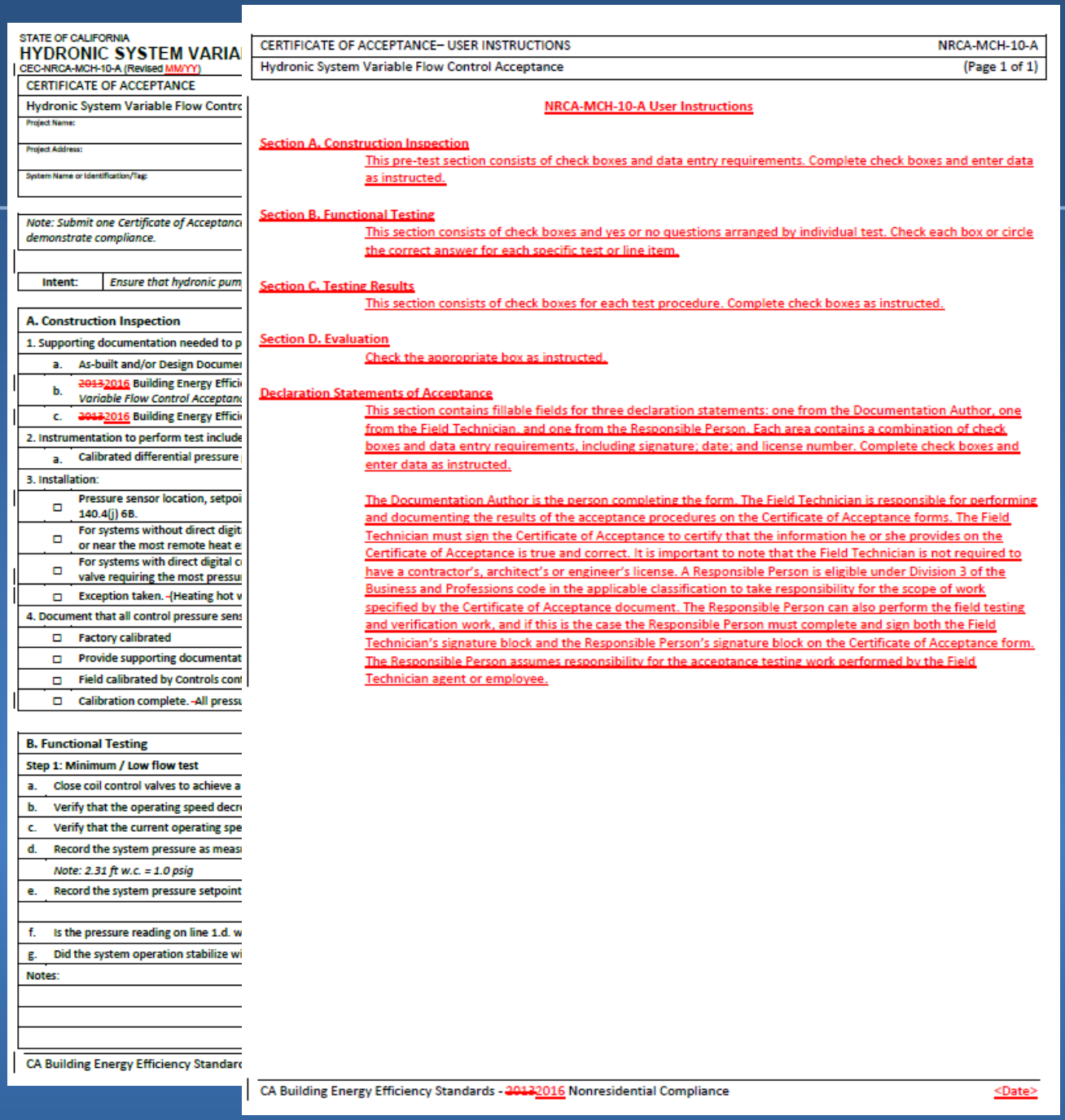
| *Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.* | Enforcement Agency Use: Checked by/Date |
|---|---|

| **Intent:** | *Ensure that 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: | |
| ☐ | Pressure sensor location, setpoint, and reset control meets the requirements of ~~2013~~2016 Building Energy Efficiency Standards section 140.4(j) 6B. |
| ☐ | 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. |
| ☐ | 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. |
| ☐ | 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): | |
| ☐ | Factory calibrated |
| ☐ | Provide supporting documentation |
| ☐ | Field calibrated by Controls contractor or other. |
| ☐ | 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 | ☐ |
| 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. | |
| | *Note: 2.31 ft w.c. = 1.0 psig* 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>



STATE OF CALIFORNIA
HYDRONIC SYSTEM VARIA
CEC-NRCA-MCH-10-A (Revised MM/YY)

CERTIFICATE OF ACCEPTANCE

Hydronic System Variable Flow Contro

Project Name:

Project Address:

System Name or Identification/Tag:

*Note: Submit one Certificate of Acceptanc demonstrate compliance.*

| Intent: | *Ensure that hydronic pum* |
|---|---|

**A. Construction Inspection**

1. Supporting documentation needed to p
   - a. As-built and/or Design Docume
   - b. ~~2013~~2016 Building Energy Effici *Variable Flow Control Acceptan*
   - c. ~~2013~~2016 Building Energy Effici
2. Instrumentation to perform test include
   - a. Calibrated differential pressure
3. Installation:
   - ☐ Pressure sensor location, setpoi 140.4(j) 6B.
   - ☐ For systems without direct digit or near the most remote heat e
   - ☐ For systems with direct digital c valve requiring the most pressu
   - ☐ Exception taken. -(Heating hot w
4. Document that all control pressure sens
   - ☐ Factory calibrated
   - ☐ Provide supporting documentat
   - ☐ Field calibrated by Controls cont
   - ☐ Calibration complete. -All pressu

**B. Functional Testing**

**Step 1: Minimum / Low flow test**

a. Close coil control valves to achieve a
b. Verify that the operating speed decr
c. Verify that the current operating spe
d. Record the system pressure as meas
   *Note: 2.31 ft w.c. = 1.0 psig*
e. Record the system pressure setpoint
f. Is the pressure reading on line 1.d. w
g. Did the system operation stabilize wi

Notes:

CA Building Energy Efficiency Standard

| 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>

# NA7.5.11 Fault Detection and Diagnostics (FDD) for Packaged Direct-Expansion (DX) Units Acceptance

STATE OF CALIFORNIA

# FAULT DETECTION AND DIAGNOSTICS FOR PACKAGED DIRECT EXPANSION UNITS

CEC-NRCA-MCH-12-A (Revised MM/YY) CALIFORNIA ENERGY COMMISSION

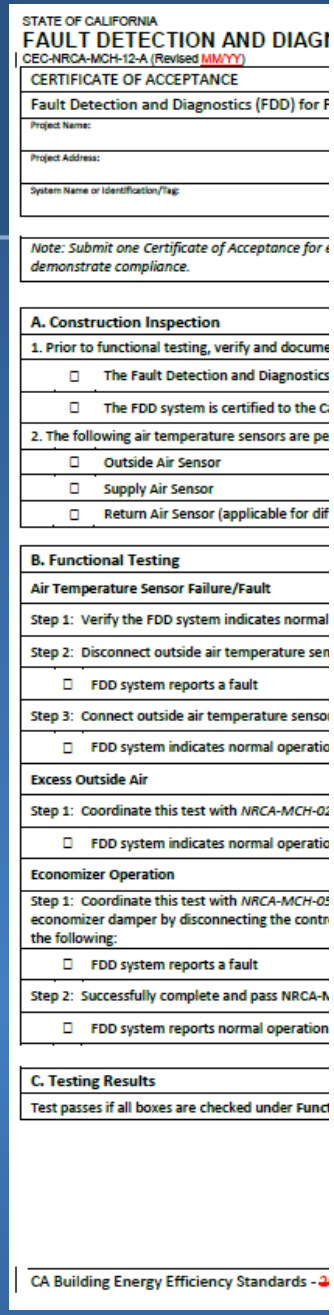
| CERTIFICATE OF ACCEPTANCE | | NRCA-MCH-12-A |
|---|---|---|
| Fault Detection and Diagnostics (FDD) for Packaged Direct Expansion Units | | (Page 1 of 3) |
| Project Name: | Enforcement Agency: | Permit Number: |
| Project Address: | City: | Zip Code: |
| System Name or Identification/Tag: | System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



STATE OF CALIFORNIA
FAULT DETECTION AND DIAGI
CEC-NRCA-MCH-12-A (Revised MM/YY)

CERTIFICATE OF ACCEPTANCE

Fault Detection and Diagnostics (FDD) for F

Project Name:

Project Address:

System Name or Identification/Tag:

*Note: Submit one Certificate of Acceptance for e demonstrate compliance.*

**A. Construction Inspection**

1. Prior to functional testing, verify and docume

- ☐ The Fault Detection and Diagnostics
- ☐ The FDD system is certified to the C

2. The following air temperature sensors are pe

- ☐ Outside Air Sensor
- ☐ Supply Air Sensor
- ☐ Return Air Sensor (applicable for dif

**B. Functional Testing**

**Air Temperature Sensor Failure/Fault**

Step 1: Verify the FDD system indicates normal

Step 2: Disconnect outside air temperature sen

- ☐ FDD system reports a fault

Step 3: Connect outside air temperature senso

- ☐ FDD system indicates normal operatio

**Excess Outside Air**

Step 1: Coordinate this test with *NRCA-MCH-02*

- ☐ FDD system indicates normal operatio

**Economizer Operation**

Step 1: Coordinate this test with *NRCA-MCH-05* economizer damper by disconnecting the contr the following:

- ☐ FDD system reports a fault

Step 2: Successfully complete and pass NRCA-M

- ☐ FDD system reports normal operation

**C. Testing Results**

Test passes if all boxes are checked under Funct

CA Building Energy Efficiency Standards - 2

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 2 of 3) |
| Project Name: | Enforcement Agency: | Permit Number: |
| Project Address: | City: | Zip Code: |
| System Name or Identification/Tag: | System Location or Area Served: | |

**D Evaluation**

☐ PASS: All Construction Inspection responses are complete and Testing Results is "Pass"

Notes:

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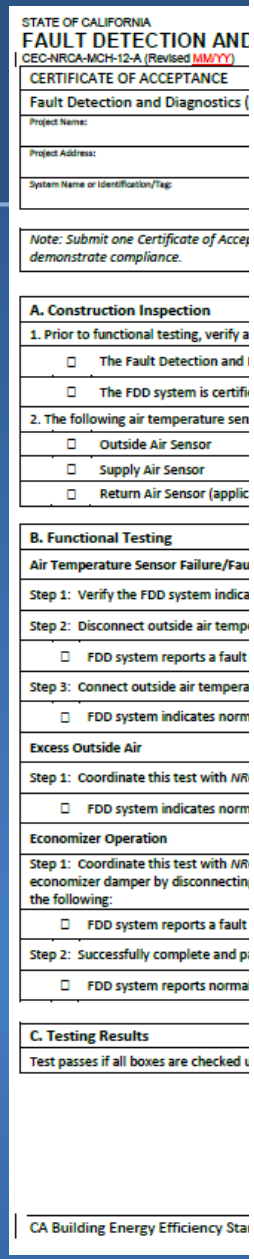
STATE OF CALIFORNIA
FAULT DETECTION AND
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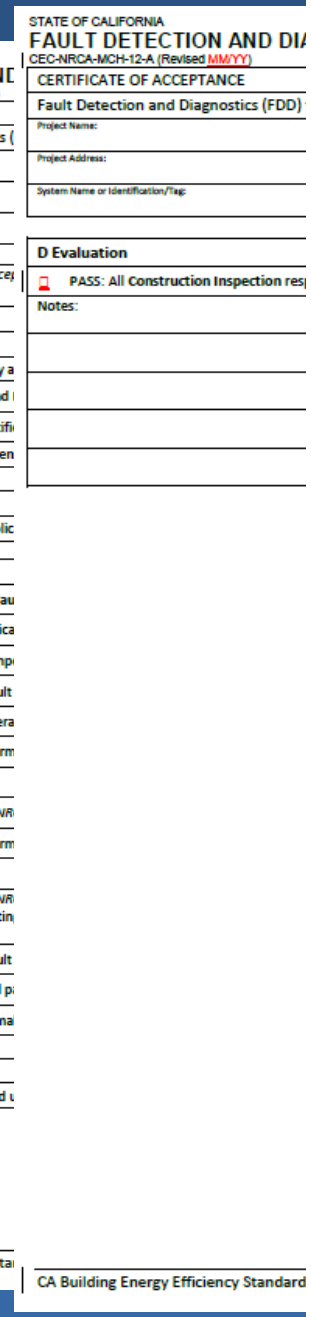
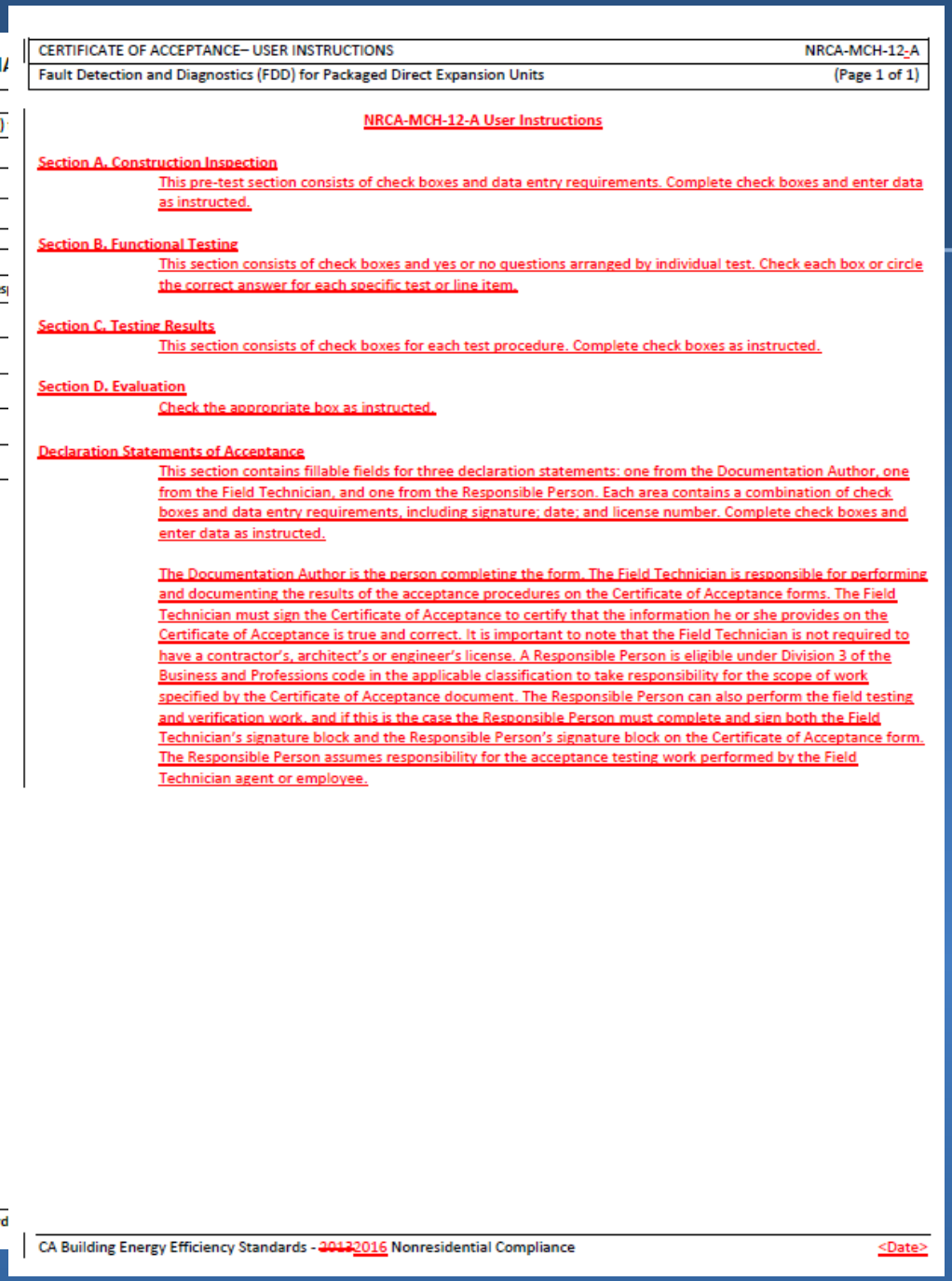
CERTIFICATE OF ACCEPTANCE
Fault Detection and Diagnostics (
Project Name:
Project Address:
System Name or Identification/Tag:
Note: Submit one Certificate of Acce
demonstrate compliance.
A. Construction Inspection
1. Prior to functional testing, verify a
The Fault Detection and
The FDD system is certifi
2. The following air temperature sen
Outside Air Sensor
Supply Air Sensor
Return Air Sensor (applic
B. Functional Testing
Air Temperature Sensor Failure/Fau
Step 1: Verify the FDD system indica
Step 2: Disconnect outside air temp
FDD system reports a fault
Step 3: Connect outside air tempera
FDD system indicates norm
Excess Outside Air
Step 1: Coordinate this test with NR
FDD system indicates norm
Economizer Operation
Step 1: Coordinate this test with NR
economizer damper by disconnectin
the following:
FDD system reports a fault
Step 2: Successfully complete and p
FDD system reports norma
C. Testing Results
Test passes if all boxes are checked
CA Building Energy Efficiency Sta


STATE OF CALIFORNIA
FAULT DETECTION AND DIA
CEC-NRCA-MCH-12-A (Revised MM/YY)
CERTIFICATE OF ACCEPTANCE
Fault Detection and Diagnostics (FDD)
Project Name:
Project Address:
System Name or Identification/Tag:
D Evaluation
PASS: All Construction Inspection res
Notes:
CA Building Energy Efficiency Standard


CERTIFICATE OF ACCEPTANCE– USER INSTRUCTIONS NRCA-MCH-12-A
Fault Detection and Diagnostics (FDD) for Packaged Direct Expansion Units (Page 1 of 1)

NRCA-MCH-12-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

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Declaration Statements of Acceptance

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# NA7.5.12 FDD for Air Handling Units and Zone Terminal Units Acceptance

STATE OF CALIFORNIA

# AUTOMATIC FAULT DETECTION AND DIAGNOSTICS FOR AIR HANDLING UNITS AND ZONE TERMINAL UNITS ACCEPTANCE

CEC-NRCA-MCH-13-A (Revised MM/YY) CALIFORNIA ENERGY COMMISSION

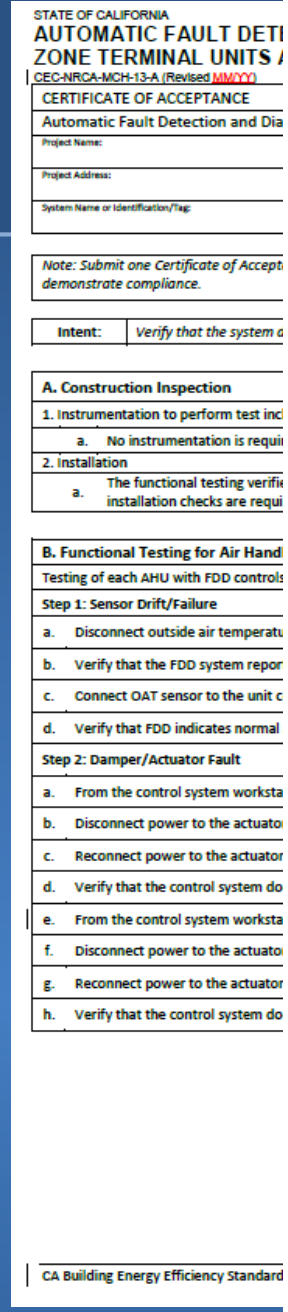
| CERTIFICATE OF ACCEPTANCE | | NRCA-MCH-13-A |
|---|---|---|
| Automatic Fault Detection and Diagnostics (FDD) for Air Handling Units and Zone Terminal Units Acceptance | | (Page 1 of 5) |
| Project Name: | Enforcement Agency: | Permit Number: |
| Project Address: | City: | Zip Code: |
| System Name 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 that the system detects common faults in air handling units and zone terminal units.* |
|---|---|

| **A. Construction Inspection** |
|---|
| 1. Instrumentation to perform test includes, but not limited to: |
| a. No instrumentation is required – changes are implemented at the building automation system control station. |
| 2. Installation |
| a. The functional testing verifies proper installation of the controls for FDD for air handling units and zone terminal units. No additional installation checks are required. |

| **B. Functional Testing for Air Handling Units** | **Results** |
|---|---|
| Testing of each AHU with FDD controls shall include the following tests: | |
| **Step 1: Sensor Drift/Failure** | |
| a. Disconnect outside air temperature sensor from unit controller | Y / N |
| b. Verify that the FDD system reports a fault | Y / N |
| c. Connect OAT sensor to the unit controller | Y / N |
| d. Verify that FDD indicates normal system operation | Y / N |
| **Step 2: Damper/Actuator Fault** | |
| a. From the control system workstation, command the mixing box dampers to full open (100% outdoor air) | Y / N |
| b. Disconnect power to the actuator and verify that a fault is reported at the control workstation | Y / N |
| c. Reconnect power to the actuator and command the mixing box dampers to full open | Y / N |
| d. Verify that the control system does not report a fault | Y / N |
| e. From the control system workstation, command the mixing box dampers to a full-closed position (0% outdoor air) | Y / N |
| f. Disconnect power to the actuator and verify that a fault is reported at the control workstation | Y / N |
| g. Reconnect power to the actuator and command the dampers closed | Y / N |
| h. Verify that the control system does not report a fault during normal operation | Y / N |



STATE OF CALIFORNIA
AUTOMATIC FAULT DETE
ZONE TERMINAL UNITS A
CEC-NRCA-MCH-13-A (Revised MM/YY)

| CERTIFICATE OF ACCEPTANCE |
|---|
| Automatic Fault Detection and Dia |
| Project Name: |
| Project Address: |
| System Name or Identification/Tag: |

*Note: Submit one Certificate of Accept demonstrate compliance.*

| Intent: | *Verify that the system* |
|---|---|

| A. Construction Inspection |
|---|
| 1. Instrumentation to perform test incl |
| a. No instrumentation is requi |
| 2. Installation |
| a. The functional testing verifie installation checks are requi |

| B. Functional Testing for Air Handl |
|---|
| Testing of each AHU with FDD controls |
| **Step 1: Sensor Drift/Failure** |
| a. Disconnect outside air temperatu |
| b. Verify that the FDD system repor |
| c. Connect OAT sensor to the unit c |
| d. Verify that FDD indicates normal |
| **Step 2: Damper/Actuator Fault** |
| a. From the control system worksta |
| b. Disconnect power to the actuato |
| c. Reconnect power to the actuator |
| d. Verify that the control system do |
| e. From the control system worksta |
| f. Disconnect power to the actuato |
| g. Reconnect power to the actuator |
| h. Verify that the control system do |

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STATE OF CALIFORNIA
**AUTOMATIC FAULT DETECTION AND DIAGNOSTICS FOR AIR HANDLING UNITS AND ZONE TERMINAL UNITS ACCEPTANCE**
CEC-NRCA-MCH-13-A (Revised MM/YY) CALIFORNIA ENERGY COMMISSION

| CERTIFICATE OF ACCEPTANCE | | NRCA-MCH-13-A |
|---|---|---|
| Automatic Fault Detection and Diagnostics (FDD) for Air Handling Units and Zone Terminal Units Acceptance | | (Page 2 of 5) |
| Project Name: | Enforcement Agency: | Permit Number: |
| Project Address: | City: | Zip Code: |
| System Name or Identification/Tag: | System Location or Area Served: | |

| Step 3: Valve/actuator fault | | |
|---|---|---|
| a. | From the control system workstation, command the heating coil valves to full open. | Y / N |
| b. | Disconnect power to the actuator and verify that a fault is reported | Y / N |
| c. | Reconnect power to the actuator and command the heating coil valve to full open | Y / N |
| d. | Verify that the control system does not report a fault | Y / N |
| e. | From the control system workstation, command the cooling coil valve to the full open position. | Y / N |
| f. | Disconnect power to the actuator and verify that a fault is reported | Y / N |
| g. | Reconnect power to the actuator and command the cooling coil valve to full open | Y / N |
| h. | Verify that the control system does not report a fault | Y / N |
| **Step 4: Inappropriate simultaneous heating, mechanical cooling, and/or economizing** | | |
| a. | From the control system workstation, override the heating coil valve and verify that a fault is reported at the control workstation | Y / N |
| b. | From the control system workstation, override the cooling coil valve and verify that a fault is reported at the control workstation | Y / N |
| c. | From the control system workstation, override the mixing box dampers and verify that a fault is reported at the control workstation | Y / N |

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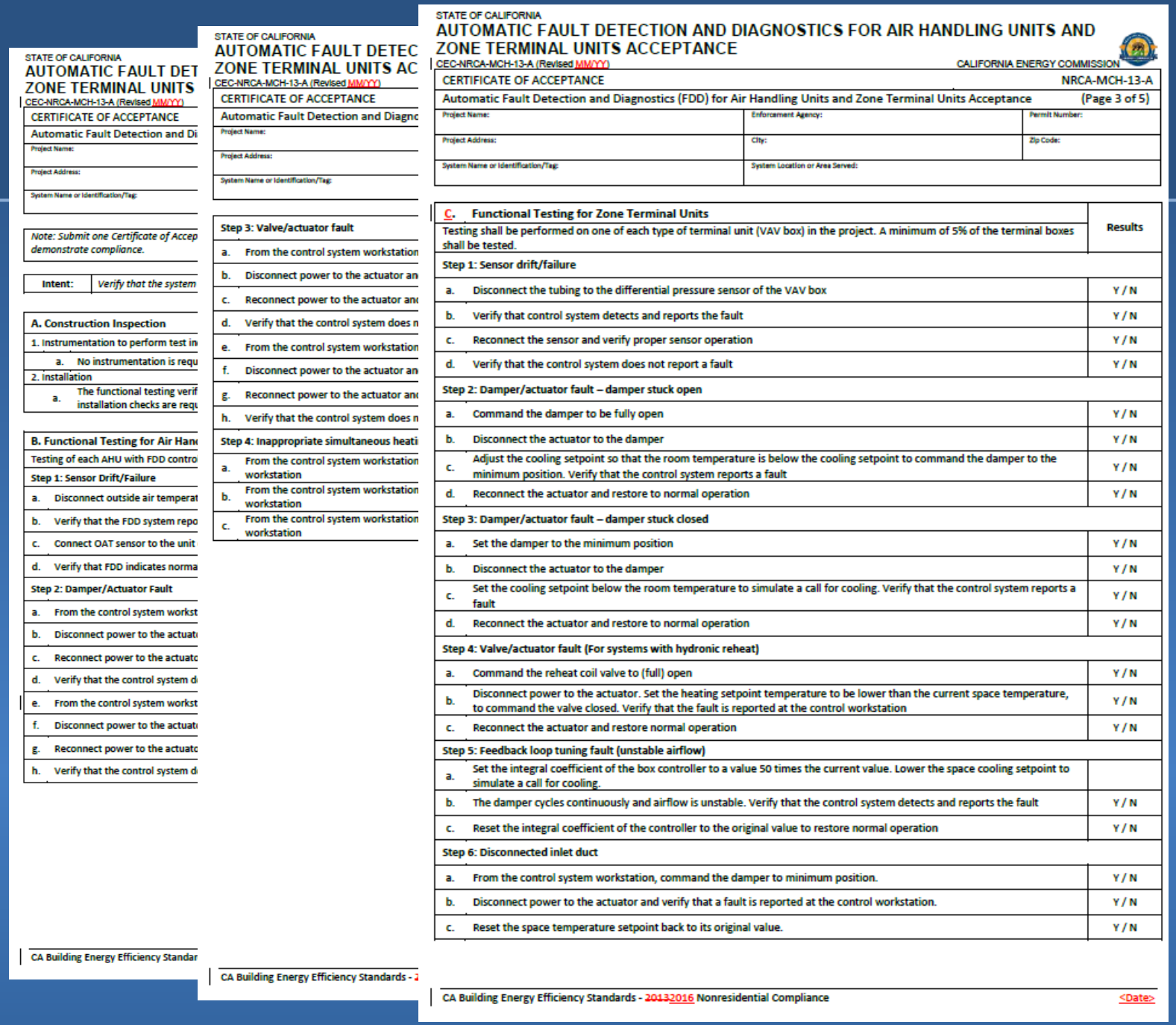

STATE OF CALIFORNIA
AUTOMATIC FAULT DET
ZONE TERMINAL UNITS
CEC-NRCA-MCH-13-A (Revised MM/YY)

CERTIFICATE OF ACCEPTANCE
Automatic Fault Detection and Di
Project Name:
Project Address:
System Name or Identification/Tag:

*Note: Submit one Certificate of Accep demonstrate compliance.*

| Intent: | *Verify that the system* |
|---|---|

**A. Construction Inspection**

1. Instrumentation to perform test in
   a. No instrumentation is requ
2. Installation
   a. The functional testing verif installation checks are requ

**B. Functional Testing for Air Han**

Testing of each AHU with FDD contro

**Step 1: Sensor Drift/Failure**

a. Disconnect outside air temperat
b. Verify that the FDD system repo
c. Connect OAT sensor to the unit
d. Verify that FDD indicates norma

**Step 2: Damper/Actuator Fault**

a. From the control system workst
b. Disconnect power to the actuat
c. Reconnect power to the actuato
d. Verify that the control system d
e. From the control system workst
f. Disconnect power to the actuat
g. Reconnect power to the actuato
h. Verify that the control system d

CA Building Energy Efficiency Standar

STATE OF CALIFORNIA
AUTOMATIC FAULT DETEC
ZONE TERMINAL UNITS AC
CEC-NRCA-MCH-13-A (Revised MM/YY)

CERTIFICATE OF ACCEPTANCE
Automatic Fault Detection and Diagnc
Project Name:
Project Address:
System Name or Identification/Tag:

**Step 3: Valve/actuator fault**

a. From the control system workstation
b. Disconnect power to the actuator an
c. Reconnect power to the actuator an
d. Verify that the control system does n
e. From the control system workstation
f. Disconnect power to the actuator an
g. Reconnect power to the actuator an
h. Verify that the control system does n

**Step 4: Inappropriate simultaneous heati**

a. From the control system workstation workstation
b. From the control system workstation workstation
c. From the control system workstation workstation

CA Building Energy Efficiency Standards - 2

STATE OF CALIFORNIA
**AUTOMATIC FAULT DETECTION AND DIAGNOSTICS FOR AIR HANDLING UNITS AND ZONE TERMINAL UNITS ACCEPTANCE**
CEC-NRCA-MCH-13-A (Revised MM/YY)
CALIFORNIA ENERGY COMMISSION

| CERTIFICATE OF ACCEPTANCE | | NRCA-MCH-13-A |
|---|---|---|
| Automatic Fault Detection and Diagnostics (FDD) for Air Handling Units and Zone Terminal Units Acceptance | | (Page 3 of 5) |
| Project Name: | Enforcement Agency: | Permit Number: |
| Project Address: | City: | Zip Code: |
| System Name or Identification/Tag: | System Location or Area Served: | |

| C. Functional Testing for Zone Terminal Units<br>Testing shall be performed on one of each type of terminal unit (VAV box) in the project. A minimum of 5% of the terminal boxes shall be tested. | | Results |
|---|---|---|
| **Step 1: Sensor drift/failure** | | |
| a. | Disconnect the tubing to the differential pressure sensor of the VAV box | Y / N |
| b. | Verify that control system detects and reports the fault | Y / N |
| c. | Reconnect the sensor and verify proper sensor operation | Y / N |
| d. | Verify that the control system does not report a fault | Y / N |
| **Step 2: Damper/actuator fault – damper stuck open** | | |
| a. | Command the damper to be fully open | Y / N |
| b. | Disconnect the actuator to the damper | Y / N |
| c. | Adjust the cooling setpoint so that the room temperature is below the cooling setpoint to command the damper to the minimum position. Verify that the control system reports a fault | Y / N |
| d. | Reconnect the actuator and restore to normal operation | Y / N |
| **Step 3: Damper/actuator fault – damper stuck closed** | | |
| a. | Set the damper to the minimum position | Y / N |
| b. | Disconnect the actuator to the damper | Y / N |
| c. | Set the cooling setpoint below the room temperature to simulate a call for cooling. Verify that the control system reports a fault | Y / N |
| d. | Reconnect the actuator and restore to normal operation | Y / N |
| **Step 4: Valve/actuator fault (For systems with hydronic reheat)** | | |
| a. | Command the reheat coil valve to (full) open | Y / N |
| b. | Disconnect power to the actuator. Set the heating setpoint temperature to be lower than the current space temperature, to command the valve closed. Verify that the fault is reported at the control workstation | Y / N |
| c. | Reconnect the actuator and restore normal operation | Y / N |
| **Step 5: Feedback loop tuning fault (unstable airflow)** | | |
| a. | Set the integral coefficient of the box controller to a value 50 times the current value. Lower the space cooling setpoint to simulate a call for cooling. | |
| b. | The damper cycles continuously and airflow is unstable. Verify that the control system detects and reports the fault | Y / N |
| c. | Reset the integral coefficient of the controller to the original value to restore normal operation | Y / N |
| **Step 6: Disconnected inlet duct** | | |
| a. | From the control system workstation, command the damper to minimum position. | Y / N |
| b. | Disconnect power to the actuator and verify that a fault is reported at the control workstation. | Y / N |
| c. | Reset the space temperature setpoint back to its original value. | Y / N |

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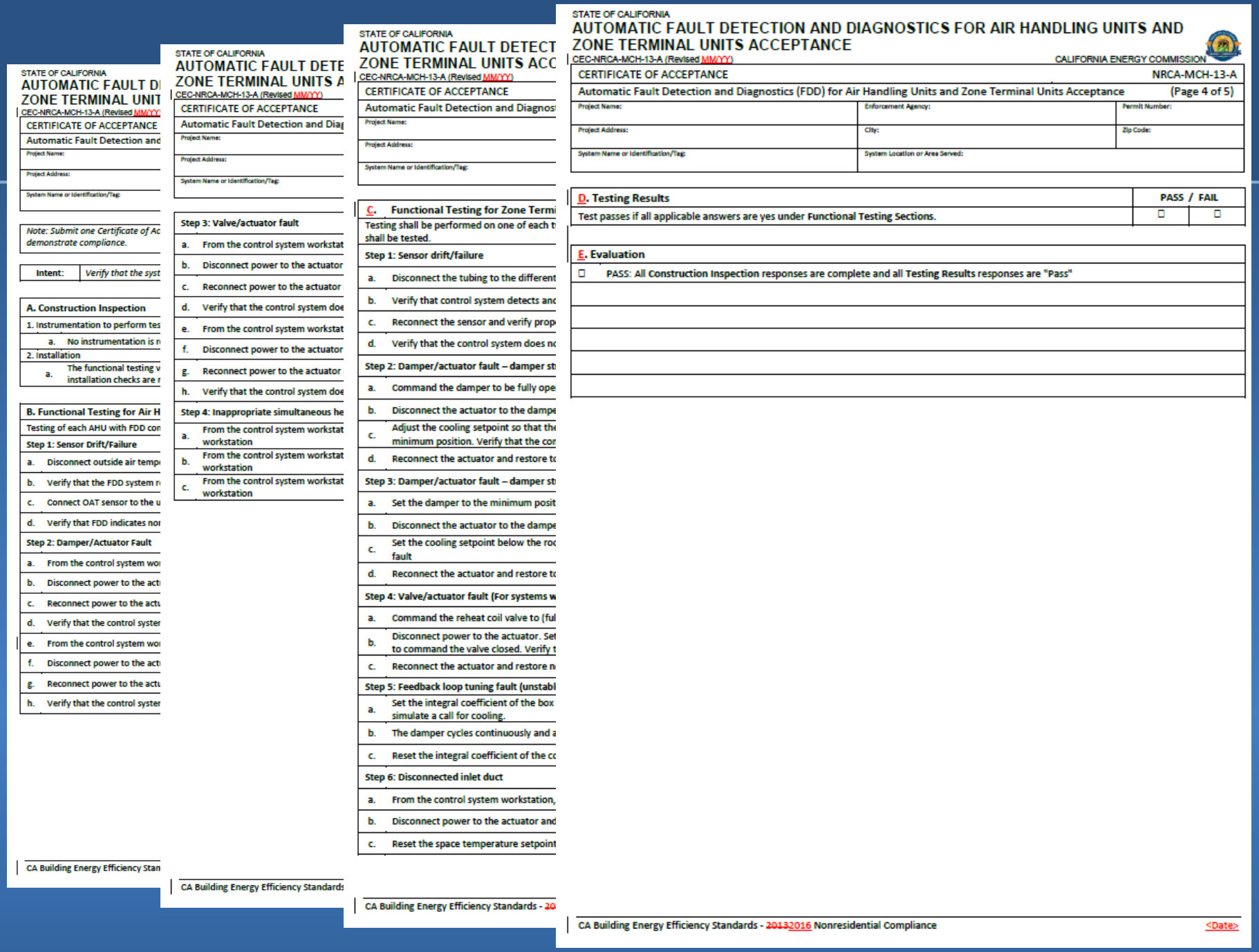


STATE OF CALIFORNIA
AUTOMATIC FAULT DETECTION AND DIAGNOSTICS FOR AIR HANDLING UNITS AND ZONE TERMINAL UNITS ACCEPTANCE
CEC-NRCA-MCH-13-A (Revised MM/YY)
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF ACCEPTANCE — NRCA-MCH-13-A
Automatic Fault Detection and Diagnostics (FDD) for Air Handling Units and Zone Terminal Units Acceptance — (Page 4 of 5)

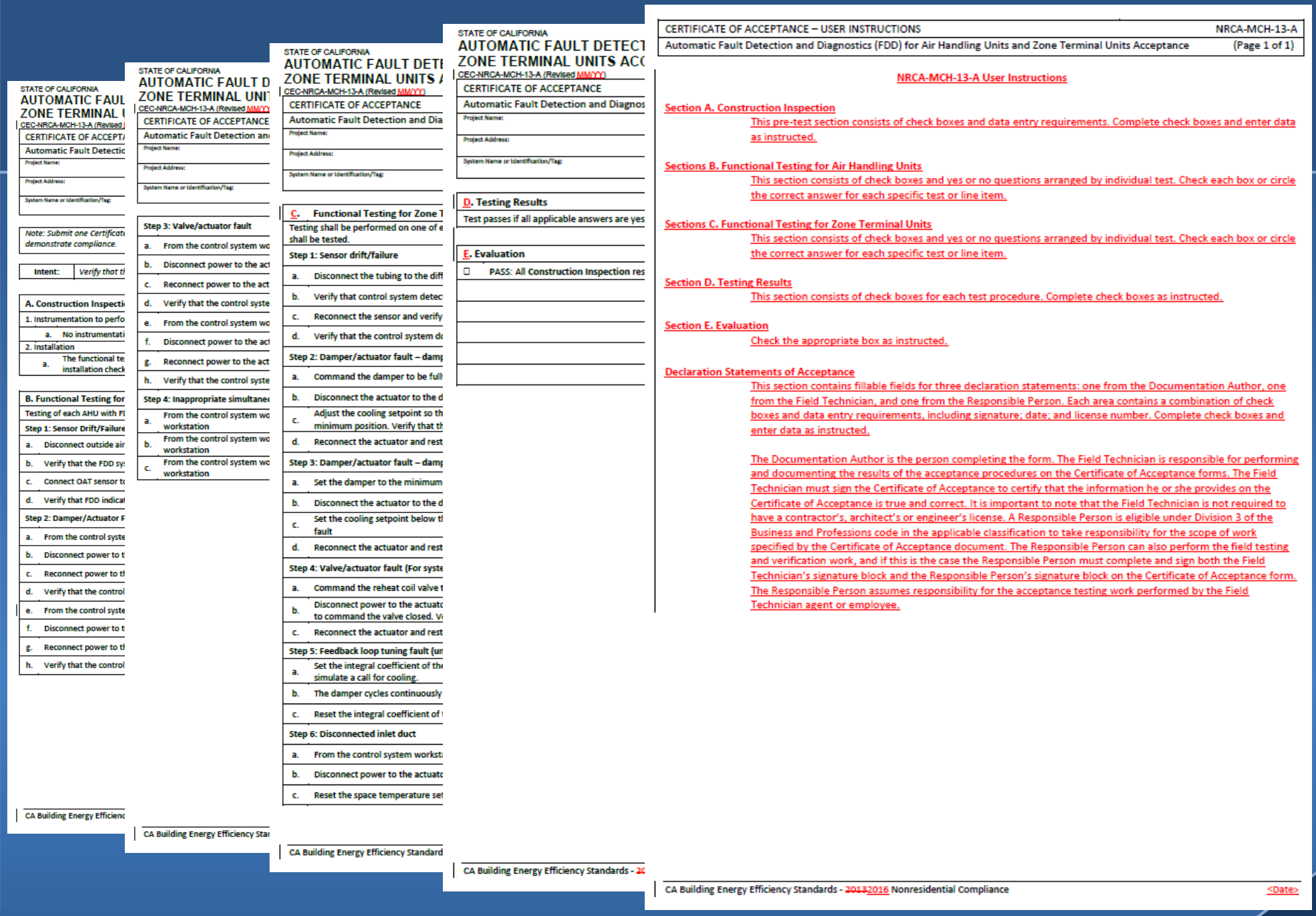
| Project Name: | Enforcement Agency: | Permit Number: |
|---|---|---|
| Project Address: | City: | Zip Code: |
| System Name or Identification/Tag: | System Location or Area Served: | |

| D. Testing Results | PASS | FAIL |
|---|---|---|
| Test passes if all applicable answers are yes under Functional Testing Sections. | ☐ | ☐ |

**E. Evaluation**

☐ PASS: All Construction Inspection responses are complete and all Testing Results responses are "Pass"

CA Building Energy Efficiency Standards - 2013~~2016~~ Nonresidential Compliance <Date>



| CERTIFICATE OF ACCEPTANCE – USER INSTRUCTIONS | NRCA-MCH-13-A |
|---|---|
| Automatic Fault Detection and Diagnostics (FDD) for Air Handling Units and Zone Terminal Units Acceptance | (Page 1 of 1) |

## NRCA-MCH-13-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.

**Sections B. Functional Testing for Air Handling Units**

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.

**Sections C. Functional Testing for Zone Terminal Units**

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 D. Testing Results**

This section consists of check boxes for each test procedure. Complete check boxes as instructed.

**Section E. 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.

# NA7.5.14 Thermal Energy Storage (TES) System Acceptance

STATE OF CALIFORNIA

# THERMAL ENERGY STORAGE (TES) SYSTEM ACCEPTANCE

CEC-NRCA-MCH-15-A (Revised MM/YY)

CALIFORNIA ENERGY COMMISSION

| CERTIFICATE OF ACCEPTANCE | | NRCA-MCH-15-A |
|---|---|---|
| Thermal Energy Storage (TES) System Acceptance | | (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: |
| a. Construction documents (plans, drawings, equipment schedule, etc.) |
| b. Approved submittals (for chillers, storage tanks, controls) |
| c. Copy of manufacturers' product literature |
| d. Copy of Title 24 code |
| e. 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) | |

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

| CERTIFICATE OF ACCEPTANCE |
|---|
| Thermal Energy Storage (TES) System Accep |
| Project Name: |
| Project Address: |
| System Name or Identification/Tag: |

*Note: Submit one Certificate of Acceptance f*
*that must demonstrate compliance.*

| Intent: | *Verify proper operation of a* |
|---|---|

| A. Construction Inspection |
|---|
| 1. Supporting documentation needed to per |
| a. Construction documents (plans, drav |
| b. Approved submittals (for chillers, sto |
| c. Copy of manufacturers' product liter |
| d. Copy of Title 24 code |
| e. Copy of pertinent appendices to Title |

| B. System Installation Information |
|---|
| *The following information for both the chille* |
| *System parameters. Information is likely to* |
| 1. Chiller(s) |
| Brand and Model: |
| Type (Centrifugal, Reciprocating, etc) and (c |
| Heat rejection type (air, water, other) |
| Charge mode capacity (tons) @ avg. fluid te |
| 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) |

CA Building Energy Efficiency Standards - 2013201

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

| CERTIFICATE OF ACCEPTANCE | NRCA-MCH-15-A |
|---|---|
| Thermal Energy Storage (TES) System Acceptance | (Page 2 of 4) |

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

2. Storage

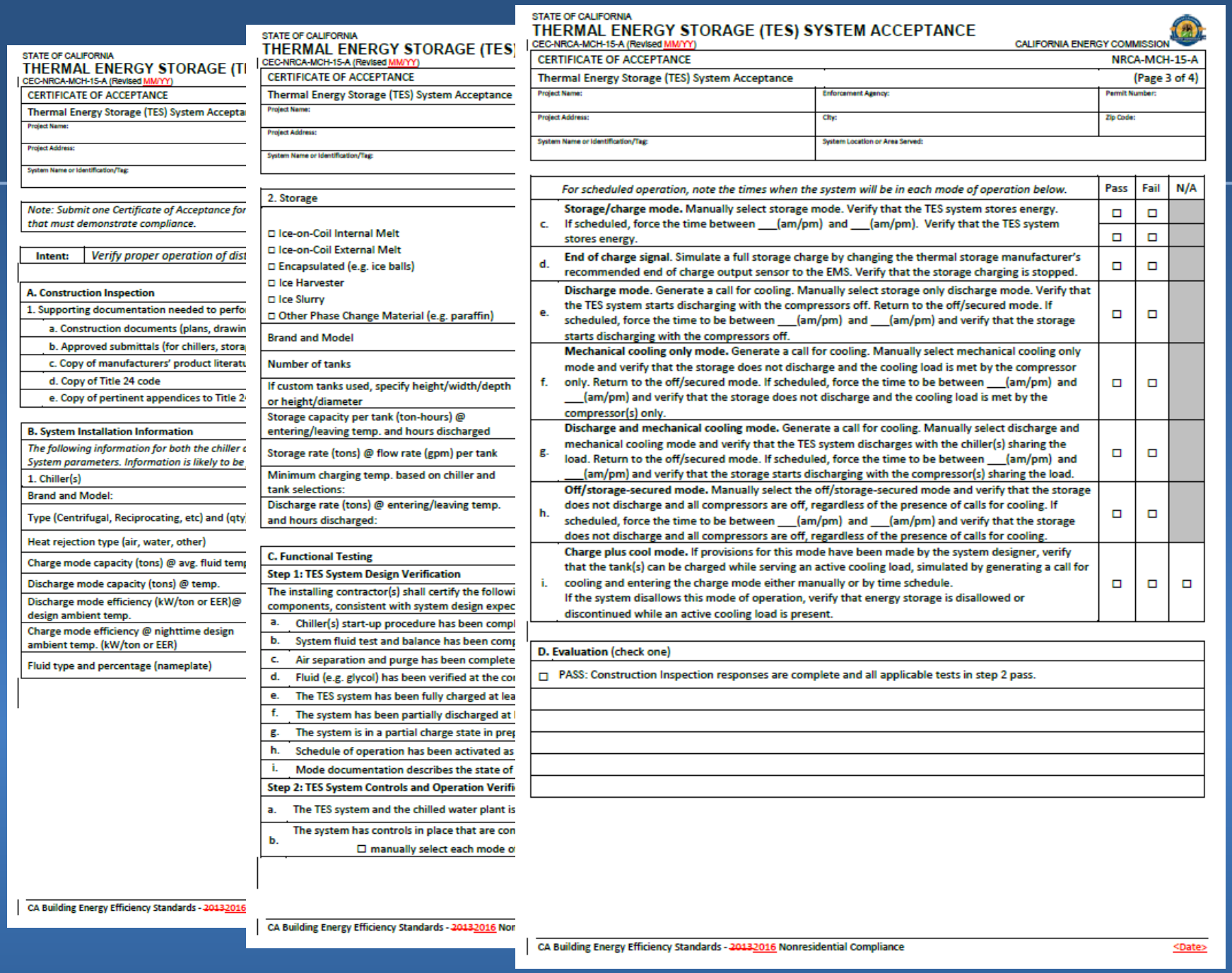
Type (Check):

| | |
|---|---|
| ☐ Ice-on-Coil Internal Melt | ☐ Chilled Water |
| ☐ Ice-on-Coil External Melt | ☐ Brine (or chilled water with additives) |
| ☐ Encapsulated (e.g. ice balls) | ☐ Eutectic Salt |
| ☐ Ice Harvester | ☐ Clathrate Hydrate Slurry (CHS) |
| ☐ Ice Slurry | ☐ Cryogenic |
| ☐ Other Phase Change Material (e.g. paraffin) | ☐ Other (specify: _____) |

| | |
|---|---|
| Brand and Model | |
| Number of tanks | |
| If custom tanks used, specify height/width/depth or height/diameter | |
| Storage capacity per tank (ton-hours) @ entering/leaving temp. and hours discharged | |
| Storage rate (tons) @ flow rate (gpm) per tank | |
| Minimum charging temp. based on chiller and tank selections: | |
| Discharge rate (tons) @ entering/leaving temp. and hours discharged: | |

| C. Functional Testing | | Results |
|---|---|---|
| **Step 1: TES System Design Verification** | | |
| The installing contractor(s) shall certify the following information, which verifies proper installation of the TES System components, consistent with system design expectations. | | |
| a. | Chiller(s) start-up procedure has been completed | Y/N |
| b. | System fluid test and balance has been completed | Y/N |
| c. | Air separation and purge has been completed | Y/N |
| d. | Fluid (e.g. glycol) has been verified at the concentration and type indicated on the design documents | Y/N |
| e. | The TES system has been fully charged at least once and charge duration noted | Y/N |
| f. | The system has been partially discharged at least once and discharge duration noted | Y/N |
| g. | The system is in a partial charge state in preparation for step 2 tests | Y/N |
| h. | Schedule of operation has been activated as designed | Y/N |
| i. | Mode documentation describes the state of system components in each mode of operation | Y/N |
| **Step 2: TES System Controls and Operation Verification** | | |
| a. | The TES system and the chilled water plant is controlled and monitored by an EMS. | ☐ Pass / ☐ Fail |
| b. | The system has controls in place that are configured for the operator to (check all that apply): ☐ manually select each mode of operation ☐ use an EMS schedule to specify mode of operation | |

CA Building Energy Efficiency Standards - 20132016 Nonresidential Compliance <Date>



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

CERTIFICATE OF ACCEPTANCE — NRCA-MCH-15-A
Thermal Energy Storage (TES) System Acceptance — (Page 3 of 4)

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

| | *For scheduled operation, note the times when the system will be in each mode of operation below.* | Pass | Fail | N/A |
|---|---|---|---|---|
| c. | **Storage/charge mode.** Manually select storage mode. Verify that the TES system stores energy. If scheduled, force the time between ___(am/pm) and ___(am/pm). Verify that the TES system stores energy. | ☐ | ☐ | |
| | | ☐ | ☐ | |
| d. | **End of charge signal.** Simulate a full storage charge by changing the thermal storage manufacturer's recommended end of charge output sensor to the EMS. Verify that the storage charging is stopped. | ☐ | ☐ | |
| e. | **Discharge mode.** Generate a call for cooling. Manually select storage only discharge mode. Verify that the TES system starts discharging with the compressors off. Return to the off/secured mode. If scheduled, force the time to be between ___(am/pm) and ___(am/pm) and verify that the storage starts discharging with the compressors off. | ☐ | ☐ | |
| f. | **Mechanical cooling only mode.** Generate a call for cooling. Manually select mechanical cooling only mode and verify that the storage does not discharge and the cooling load is met by the compressor only. Return to the off/secured mode. If scheduled, force the time to be between ___(am/pm) and ___(am/pm) and verify that the storage does not discharge and the cooling load is met by the compressor(s) only. | ☐ | ☐ | |
| g. | **Discharge and mechanical cooling mode.** Generate a call for cooling. Manually select discharge and mechanical cooling mode and verify that the TES system discharges with the chiller(s) sharing the load. Return to the off/secured mode. If scheduled, force the time to be between ___(am/pm) and ___(am/pm) and verify that the storage starts discharging with the compressor(s) sharing the load. | ☐ | ☐ | |
| h. | **Off/storage-secured mode.** Manually select the off/storage-secured mode and verify that the storage does not discharge and all compressors are off, regardless of the presence of calls for cooling. If scheduled, force the time to be between ___(am/pm) and ___(am/pm) and verify that the storage does not discharge and all compressors are off, regardless of the presence of calls for cooling. | ☐ | ☐ | |
| i. | **Charge plus cool mode.** If provisions for this mode have been made by the system designer, verify that the tank(s) can be charged while serving an active cooling load, simulated by generating a call for cooling and entering the charge mode either manually or by time schedule. If the system disallows this mode of operation, verify that energy storage is disallowed or discontinued while an active cooling load is present. | ☐ | ☐ | ☐ |

**D. Evaluation** (check one)

☐ PASS: Construction Inspection responses are complete and all applicable tests in step 2 pass.

CA Building Energy Efficiency Standards - ~~2013~~2016 Nonresidential Compliance <Date>

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
Project Name:
Project Address:
System Name or Identification/Tag:

2. Storage

☐ Ice-on-Coil Internal Melt
☐ Ice-on-Coil External Melt
☐ Encapsulated (e.g. ice balls)
☐ Ice Harvester
☐ Ice Slurry
☐ Other Phase Change Material (e.g. paraffin)

Brand and Model
Number of tanks
If custom tanks used, specify height/width/depth or height/diameter
Storage capacity per tank (ton-hours) @ entering/leaving temp. and hours discharged
Storage rate (tons) @ flow rate (gpm) per tank
Minimum charging temp. based on chiller and tank selections:
Discharge rate (tons) @ entering/leaving temp. and hours discharged:

**C. Functional Testing**

**Step 1: TES System Design Verification**

The installing contractor(s) shall certify the followi components, consistent with system design expec

a. Chiller(s) start-up procedure has been compl
b. System fluid test and balance has been comp
c. Air separation and purge has been complete
d. Fluid (e.g. glycol) has been verified at the co
e. The TES system has been fully charged at lea
f. The system has been partially discharged at
g. The system is in a partial charge state in prep
h. Schedule of operation has been activated as
i. Mode documentation describes the state of

**Step 2: TES System Controls and Operation Verifi**

a. The TES system and the chilled water plant is
b. The system has controls in place that are con
☐ manually select each mode o

CA Building Energy Efficiency Standards - ~~2013~~2016 Nor

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

CERTIFICATE OF ACCEPTANCE
Thermal Energy Storage (TES) System Accepta
Project Name:
Project Address:
System Name or Identification/Tag:

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

**Intent:** *Verify proper operation of dist*

**A. Construction Inspection**

1. Supporting documentation needed to perfo
a. Construction documents (plans, drawin
b. Approved submittals (for chillers, stora
c. Copy of manufacturers' product literatu
d. Copy of Title 24 code
e. Copy of pertinent appendices to Title 2

**B. System Installation Information**

*The following information for both the chiller System parameters. Information is likely to be*

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)

CA Building Energy Efficiency Standards - ~~2013~~2016

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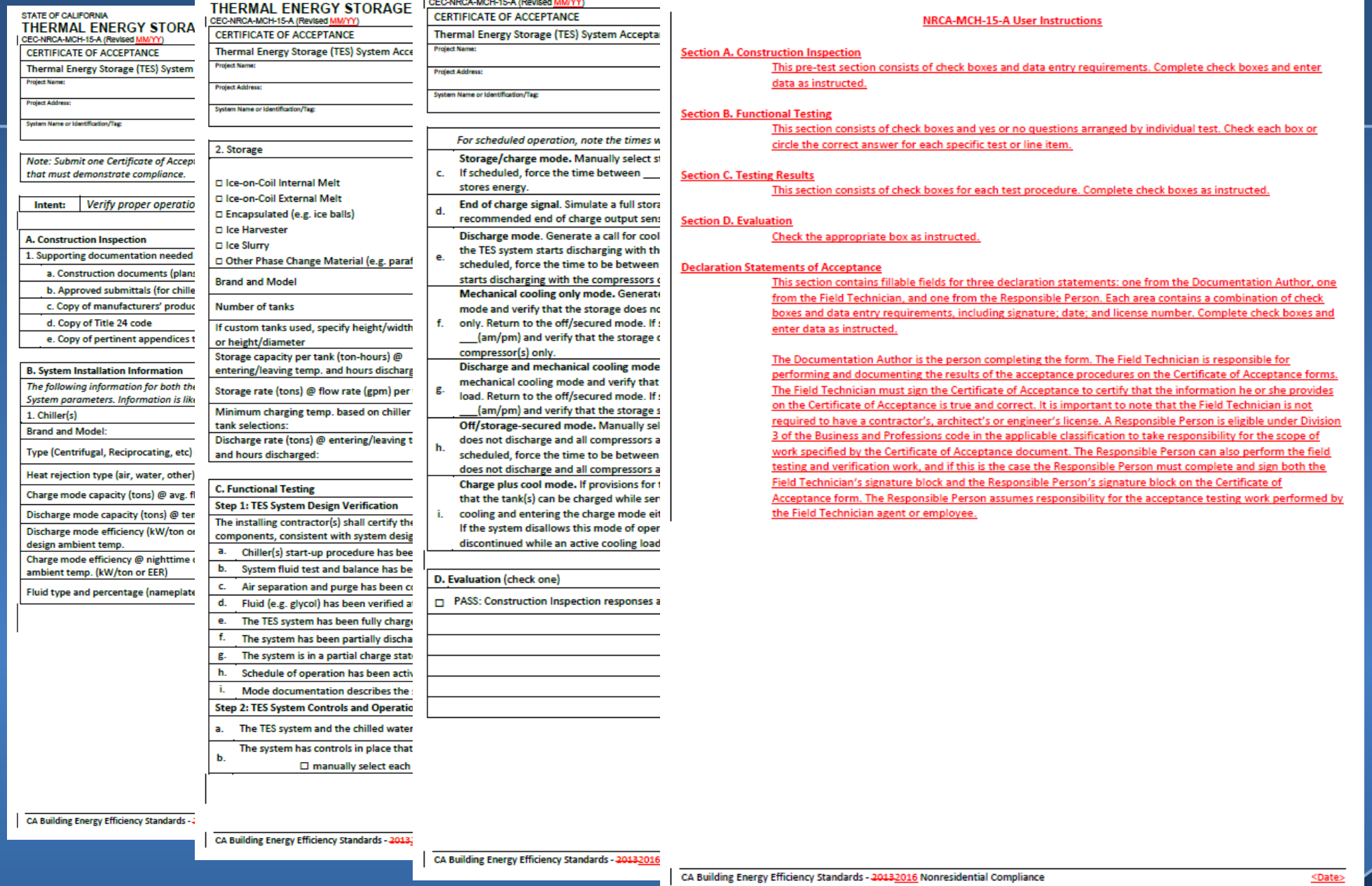


STATE OF CALIFORNIA
THERMAL ENERGY STORA
CEC-NRCA-MCH-15-A (Revised MM/YY)
CERTIFICATE OF ACCEPTANCE
Thermal Energy Storage (TES) System
Project Name:
Project Address:
System Name or Identification/Tag:
Note: Submit one Certificate of Accep
that must demonstrate compliance.
Intent: Verify proper operatio
A. Construction Inspection
1. Supporting documentation needed
a. Construction documents (plans
b. Approved submittals (for chille
c. Copy of manufacturers' produc
d. Copy of Title 24 code
e. Copy of pertinent appendices t
B. System Installation Information
The following information for both the
System parameters. Information is like
1. Chiller(s)
Brand and Model:
Type (Centrifugal, Reciprocating, etc)
Heat rejection type (air, water, other)
Charge mode capacity (tons) @ avg. fl
Discharge mode capacity (tons) @ ter
Discharge mode efficiency (kW/ton or
design ambient temp.
Charge mode efficiency @ nighttime
ambient temp. (kW/ton or EER)
Fluid type and percentage (nameplate
CA Building Energy Efficiency Standards -

STATE OF CALIFORNIA
THERMAL ENERGY STORAGE
CEC-NRCA-MCH-15-A (Revised MM/YY)
CERTIFICATE OF ACCEPTANCE
Thermal Energy Storage (TES) System Acce
Project Name:
Project Address:
System Name or Identification/Tag:
2. Storage
☐ Ice-on-Coil Internal Melt
☐ Ice-on-Coil External Melt
☐ Encapsulated (e.g. ice balls)
☐ Ice Harvester
☐ Ice Slurry
☐ Other Phase Change Material (e.g. paraf
Brand and Model
Number of tanks
If custom tanks used, specify height/width
or height/diameter
Storage capacity per tank (ton-hours) @
entering/leaving temp. and hours discharg
Storage rate (tons) @ flow rate (gpm) per
Minimum charging temp. based on chiller
tank selections:
Discharge rate (tons) @ entering/leaving t
and hours discharged:
C. Functional Testing
Step 1: TES System Design Verification
The installing contractor(s) shall certify the
components, consistent with system desig
a. Chiller(s) start-up procedure has bee
b. System fluid test and balance has be
c. Air separation and purge has been c
d. Fluid (e.g. glycol) has been verified a
e. The TES system has been fully charge
f. The system has been partially discha
g. The system is in a partial charge stat
h. Schedule of operation has been activ
i. Mode documentation describes the
Step 2: TES System Controls and Operatio
a. The TES system and the chilled water
b. The system has controls in place that
☐ manually select each
CA Building Energy Efficiency Standards - 2013

STATE OF CALIFORNIA
THERMAL ENERGY STORAGE (TI
CEC-NRCA-MCH-15-A (Revised MM/YY)
CERTIFICATE OF ACCEPTANCE
Thermal Energy Storage (TES) System Acceptar
Project Name:
Project Address:
System Name or Identification/Tag:
For scheduled operation, note the times w
c. Storage/charge mode. Manually select st
If scheduled, force the time between ___
stores energy.
d. End of charge signal. Simulate a full stora
recommended end of charge output sens
e. Discharge mode. Generate a call for cool
the TES system starts discharging with th
scheduled, force the time to be between
starts discharging with the compressors c
f. Mechanical cooling only mode. Generat
mode and verify that the storage does nc
only. Return to the off/secured mode. If s
___(am/pm) and verify that the storage c
compressor(s) only.
g. Discharge and mechanical cooling mode
mechanical cooling mode and verify that
load. Return to the off/secured mode. If s
___(am/pm) and verify that the storage s
h. Off/storage-secured mode. Manually sel
does not discharge and all compressors a
scheduled, force the time to be between
does not discharge and all compressors a
i. Charge plus cool mode. If provisions for t
that the tank(s) can be charged while ser
cooling and entering the charge mode eit
If the system disallows this mode of oper
discontinued while an active cooling load
D. Evaluation (check one)
☐ PASS: Construction Inspection responses a
CA Building Energy Efficiency Standards - 20132016

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

NRCA-MCH-15-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.

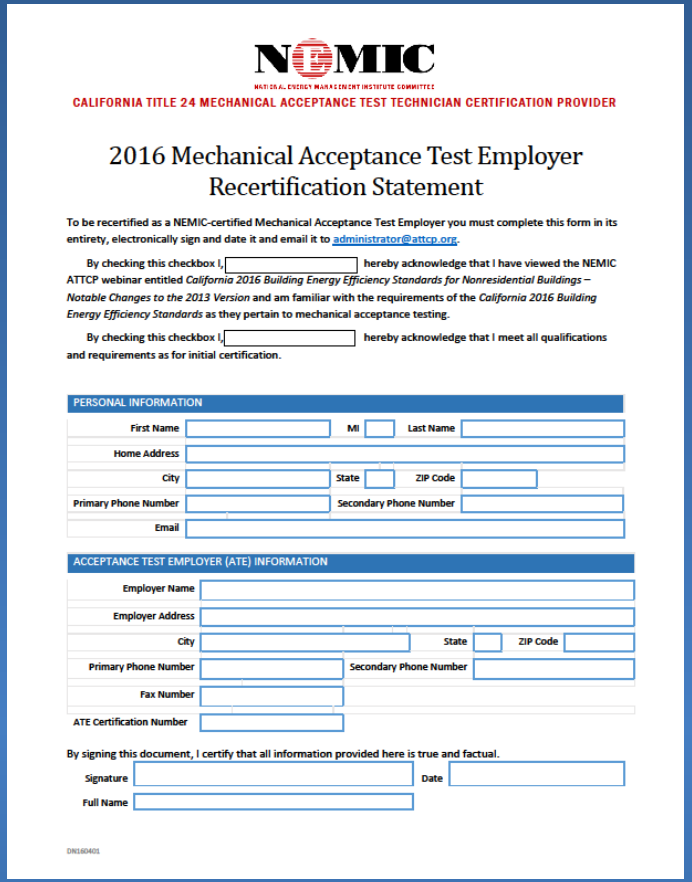
CA Building Energy Efficiency Standards - 20132016 Nonresidential Compliance <Date>

The latest version of the Mechanical Acceptance Forms can be downloaded from the CEC website at http://www.energy.ca.gov/2015publications/CEC-400-2015-033/appendices/forms/NRCA/

# 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.



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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

DN160401

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# Thank you!