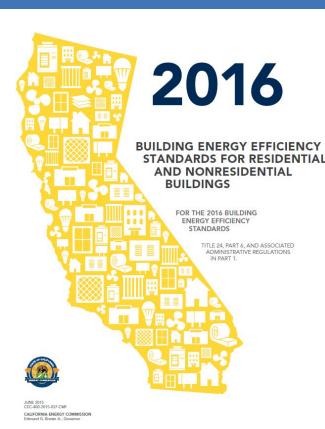
DOCKETED

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





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.



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.



Overview

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



Overview

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



CHANGES TO STANDARDS PART 1 – California Building Standards Administrative Code



10-103.2 – NONRESIDENTIAL MECHANICAL ACCEPTANCE TEST TRAINING AND CERTIFICATION

- (b)1A. No changes with regard to number of (300) Certified Acceptance Test Technicians for the mandates to take effect.
- (c)3B(vi) Recertification. The ATTCP shall recertify all Acceptance Test Technicians and Acceptance Test Employers prior to the implementation of each adopted update to the Building Energy Efficiency Standards as these updates affect the acceptance test requirements. Recertification requirements and procedures shall only apply to those specific elements that are new or modified in future updates to Building Energy Efficiency Standards.



10-103.2 – NONRESIDENTIAL MECHANICAL ACCEPTANCE TEST TRAINING AND CERTIFICATION

- § 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

© 2016 NEMIC



Page 48

2016 Building Energy Efficiency Standards

TABLE 100.0-A APPLICATION OF STANDARDS						
Occupancies	Application	Mandatory	Prescriptive	Performance	Additions/Alterations	
General Provisions fo	r All Buildings	100.0, 100.1, 100.2, 1	10.0			
	General	120.0	140.0, 140.2			
	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	140.0, 140.1 14		
Nonresidential.	Water Heating	110.3, 120.3, 120.8, 120.9	140.5		141.0	
High-Rise Residential, And Hotels/Motels	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			
	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)	



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 <u>http://www.energy.ca.gov/title24/equipment_cert/fdd/</u>



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



New Acce	eptance Test Requirements for 2016 Page 13-1	
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)

© 2016 NEMIC



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



OUT	DO		CALIFORNIA ENER	
		ATE OF ACCEPTANCE		NRCA-MCH-02-A
└──		Air Acceptance	•	(Page 1 of 3)
Project			Enforcement Agency:	Permit Number:
Project	Addres	e	City:	Zip Code:
System	Name	or identification/Tag:	System Location or Area Served:	
			system Enforcement Agency Use: Checked by/Date	
		bmit one Certificate of Acceptance for each	system Enforcement Agency use: Unecked by/Date	
that	mus	t demonstrate compliance.		
Inter	nt:	Verify measured outside airflow reading is wit units. Reference MECH-3C (Column H or Colum	hin ± 10% of the total required outside airflow. Required for all n m I) or Mechanical Equipment Schedules.	ewly installed HVAC
A. Co	onsti	uction Inspection		
Note	: MC)	1-02-A can be performed in conjunction with M	CH-07-A Supply Fan VFD Acceptance (if applicable) since testing a	ictivities overlap.
1.	Sup	porting documentation needed to perform test	includes:	
	a		e, Mechanical Equipment Schedules, Equipment	
		Start-Up Sheets or Balancing Reports).	Manual data in the second data as a second of the	and the side of a
	D.		s Nonresidential Compliance Manual (NA7.5.1.1 Ventilation Syste Volume Systems Outdoor Air Acceptance At-A-Glance).	ems: Variable Air
	c.	20132016 Building Energy Efficiency Standard		
2.		rumentation needed to perform test includes:		
		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 wit	thin one year):	
З.	Syst	em type (check either VAV or CAV):	VAV CAV	
	а.	Check if Variable Air Volume (VAV) and compl		
		 Outside airflow is either factory calibrate Check if factory calibrated and 	d or field calibrated. d attach calibration certification.	
		Check if field calibrated and a		
		ii. Damper Control (must be checked):		
			ing used to control outside air{This is NOT a fixed minimum po being utilized to control outside air (check method used)	sition).
		 Outdoor Air CFM Compensati 		
		Energy Balance Method		
		Demand Control Ventilation		
		Return Fan Tracking		
		 Injection Fan Method Dedicated Minimum Ventilati 	on Damper with Pressure Control	
		 Other Active Control, Describe 		
	b.	Check if Constant Air Volume (CAV) and verify	the following:	
4.			a fixed minimum OSA when the unit is on.	
4.	wiet	hod of delivering outside air to the unit (check of Outside air is ducted to the return air plea	one of the following): num. Confirm that outside air is ducted to either (check one of th	e following):
		 Within five ft. of the unit. 		B/*
			the air directed substantially toward the unit.	
			te outside air to the unit. (i.e. outside air is ducted directly to the	e unit or outside air is
5.			1-hour period immediately before the building is normally occu kedl:	pied to provide (one
	a.	The conditioned floor area times the ventilation	on rate from the 2013 <u>2016</u> Building Energy Efficiency Standards T	TABLE 120.1-A, or 15
	b.	cfm per person times the expected number of	• •	
Ĺ		3 Complete air changes to the zone se	rveu by the air handler.	
CAB	uildin	g Energy Efficiency Standards - 20132016 Nonro	esidential Compliance	<date></date>





		STATE OF CALIFORNIA OUTDOOR AIR ACCEPTANCE CEC-NRCA-MCH-02-A (Revised MM/YY)	CALIFORNIA ENER	
	OUTDOOR AIR ACCEPT/ CEC-NRCA-MCH-02-A (Revised MM/YY)	CERTIFICATE OF ACCEPTANCE		NRCA-MCH-0
'	CERTIFICATE OF ACCEPTANCE	Outdoor Air Acceptance		(Page 2 d
	Outdoor Air Acceptance	Project Name:	Enforcement Agency:	Permit Number:
	Project Name:	Project Address:	Chy:	Zip Code:
	Project Address:	System Name or Identification/Tag:	System Location or Area Served:	L

		B. NA7.5.1.1 Outdoor Air Acceptance Functional Testing						
1	Submit one Certificate of Ac ust demonstrate complianc	Step 1: Disable demand control ventilation (if applicable)						
chuc m	ast demonstrate compliant	Step 2: Verify unit is not in economizer mode during test (economizer disabled).						
Intent:	Verify measured outside a	Note: Shaded boxes do not apply for CAV systems						
	units. Reference MECH-3C	Step 3: CAV and VAV testing at full supply airflow						
A. Con	struction Inspection	Adjust supply air to achieve design airflow or maximum airflow at full a.						
Note: N	ICH-02-A can be performed in	coolingRecord VFD speed (Hz). b. Measured outdoor airflow reading (cfm)		Hz				
		Required outdoor airflow (cfm) (from MCH-03, Column I, or Mechanical	cfm	cfm				
1. S	upporting documentation nee As-built and/or design doc	c. Equipment Schedules).	cfm	cfm				
a	Start-Up Sheets or Balanci	d. Time for outside air damper to stabilize after full supply airflow is achieved (minutes):		min				
D	 20132016 Building Energy Systems At-A-Glance and 	Step 4: VAV testing at reduced supply airflow	CAV	VAV				
	20132016 Building Energy	 Adjust supply airflow to either the sum of the minimum zone airflows, full heating, or 30% of the total design airflowRecord VFD speed (Hz). 		Hz				
	strumentation needed to per	b. Measured outdoor airflow reading (cfm)		cfm				
a. b		 c. Required outdoor airflow (cfm) (from MCH-03, Column I, or mechanical equipment schedules). 		cfm				
	i. Method and equipn	 d. Time for outside air damper to stabilize after reduced supply airflow is achieved (minutes): 		min				
	ii. Equipment calibrati	Step 5: Return to initial conditions (check)						
	3. System type (check either VAV							
a	. Check if Variable Air Volur i. Outside airflow is ei	C. Testing Calculations & Results						
	Check if fi	Determine Percent Outside Air at full supply airflow (%OArA) for Step 3						
	Check if fi		%	%				
	ii. Damper Control (mi	a. %OA _{VA} = Measured outdoor airflow reading /Required outdoor airflow (Step <u>3</u> b/Step <u>3</u> c)						
	iii. One of the following	b. %OA_{IA} is within 10% of design Outside Air. (%OA_{IA} ≤ 110%)	Y / N	Y / N				
	Outdoor	 Outside air damper position stabilizes within 5 minutes (Step <u>3</u>d < 5 minutes) 		Y / N				
	Energy Ba	Determine Percent Outside Air at reduced supply airflow (%OA _{RA}) for Step <u>4</u> (VAV only)						
	Demand (Return Fa	a. %OA _{RA} = Measured outdoor airflow reading /Required outdoor airflow reading (Step <u>4</u> b/Step <u>4</u> c)		%				
		b. %OA_{NA} is within 10% of design Outside Air. (OA_{NA} ≤ 110%)		Y / N				
	Dedicated	c. Outside air damper position stabilizes within 5 minutes (Step <u>4</u> d < 5 minutes)		Y / N				
ь	 Other Act Check if Constant Air Volu 	Note: The intent of this test is to ensure that 1) all air handlers provide the minimum amount of OSA and controls to avoid over ventilation.	2) VAV air handlers	use dynamic				
	System is							
4. N	1ethod of delivering outside ai	D. Evaluation						
	Outside air is ducted Within fr							
	Within 1	PASS: All Construction Inspection responses are complete and Testing Calculations & Results respon (Y - yes)	nses are positive					
1								

Return air plenum is I provided independen

cfm per person times the

5. Pre-occupancy purge has been of the following methods must a. The conditioned floor area

b.

Project Address: System Name or Identification/Tag:

3 <u>C</u>omplete air ch CA Building Energy Efficiency Standar

© 2016 NEMIC

CA Building Energy Efficiency Standards - 20132016 Nonresidential Compliance

<Date>

NRCA-MCH-02-A

(Page 2 of 3) Permit Number:



The C Outroom Mark COEPTING UTDOOR AND ACCEPTING UTDOOR AND ACCEPTIN			STATE OF CALIFORNIA OUTDOOR AIR ACCEPTANCE			
INITE DOCINAL Image: Control Cont Control Cont Control Control Control Cont Control Cont					C/	
		CEC-NRCA-MCH-02-A (Revised MM/YY)		· · ·		
Definition of a Screptions mainteent Mainteen			-	Enforcement Agen	ch:	
Under Arr Arcorptions Impaired and the control of the co			Broke B B Black		-	an de de
Teachard Teachard Teachard Teachard Teachard Teachard Teachard Teachard Teachard Teachard Teachard Teachard Teachard Teachard Teachard Teachard Teachard Teachard			Project Address:	city:		zip code:
Test Submittantian production Descriptions of Acceptance decommentation is accurate and complete. Test Submittantian production is accurate and complete. Submittantian production is accurate and complete. Test Submittantian production is accurate and complete. Submittantian production is accurate and complete. Test Submittantian production is accurate and complete. Submittantian production is accurate and complete. Submittantian production is accurate and complete. Submittantian production is accurate and complete. Submittantian production is accurate and complete. Submittantian production is accurate and complete. Submittantian production is accurate and complete. Submittantian production is accurate and complete. Submittantian production is accurate and complete. Submittantian production is accurate and complete. Submittantian production is accurate and complete. Submittantian production is accurate and complete. Submittantian production is accurate and complete. Submittantian production is accurate and complete. Submittantian production is accurate and complete. Submittantian production is accurate and complete. Submittantian production is accurate and complete. Submittantian production is accurate and complete. Submittantian production is accurate and complete. Submittantian production is accurate and complete. Submittantian productin production is acc		Project Address:	System Name or Identification/Tag:	System Location or	Area Served:	•
Note: Submit one Certificate /A function market model completes In CHY Internation Address Address and CHY Internation Address and CHY Internation Address and Completes Note: Submit one Certificate /A function market model completes In CHY Internation Address Add	Project Address:	System Name or Identification/Tag:				
Note: Note: Description: Intermediation: Intermediation: Intermediation: Description: Intermediation: Intermediation: Description: Description: Intermediation: Intermediation: Description: Description: Intermediation: Description: Description: Description: Description: Intermediation: Description: Descrintescri	System Name or Identification/Tag:		DOCUMENTATION AUTHOR'S DECLARATION STATEME	ENT		
Note::Source out criticate of Acceptance complex Bar 1: Barle dermand control werden complex Barl 1: Barle dermand control werden complex Inter::::::::::::::::::::::::::::::::::::		P. NA7 E 1 1 Outdoor Air Accontance E		entation is accura		
Instrumental and/or demonstrate company lane. Instrumental and/or demonstrate company lane. Instrumental and/or demonstrate company lane. Instrumental and/or demonstrate company lane. Instrumental and/or demonstrate company lane. Instrumental and/or demonstrate company lane. Instrumental and/or demonstrate company lane. A. Construction hypertial Instrumental and/or demonstrate company lane. Instrumental and/or demonstrate company lane. Instrumental and/or demonstrate company lane. A. Construction hypertial and company lane. Instrumental and/or demonstrate company lane. Instrumental and/or demonstrate company lane. Instrumental and/or demonstrate company lane. A. Construction in the spectrate complex with the sp	Note: Submit one Certificate of A		Documentation Author Name:		Documentation Author Signature:	
Internet wordy measured analysis Processes Processes Processes A. Construction Insegration Sep 3: CAX and VAX basing a KM supply for CAV program Processes Processes <td>that must demonstrate complian</td> <td></td> <td>Documentation Author Company Name:</td> <td></td> <td>Date Signed:</td> <td></td>	that must demonstrate complian		Documentation Author Company Name:		Date Signed:	
Intermeter Intermeter Construction regreter Proce A. Construction regreter 3. Supporting documentation regime to realize in formation realized in the parameter of the state of california: Image: California: <td>Marify manufactured autoiday</td> <td></td> <td>Address:</td> <td></td> <td>ATT Certification Identification (If applicat</td> <td>ie):</td>	Marify manufactured autoiday		Address:		ATT Certification Identification (If applicat	ie):
A. Construction inspection Index Activity rays for the status design in a conjug. Second and the specification is configured on this certificate of acceptance is true and correct. 1. Supporting documentation in a conjug. Second and the specification and th			Chulthata/Xer		Dhone:	
PLID TECHNICIAN DECLARITION STATEMENT PLID TECHNICIAN SECOND SE			Gry/state/ap.		ritore.	
Note: MACH 20-A can be profound in b. Measured audoor arithow (red) I certify the following under penalty of periods on this certificate of Acceptance (red) area (red) 1. Supporting documentation area Beguined subdoor arithow (red) I information provided on this Certificate of Acceptance complex with the applicable acceptance requirements indicated in the plane and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements indicated in the plane and specifications for the construction or installation identified on this Certificate of Acceptance (red) (red) (rm) 2. Instruments and procedures specified in Reference complex with the applicable acceptance requirements indicated in the plane and specifications proved by the enforcement agency, and conforms to the applicable acceptance intro addition (red) (rm) (rm) 2. Instruments and procedures specified in Reference conversion with applicable acceptance intro addition (red) (rm) (rm) 3. Explorements and procedures specified in Reference tormal deviation (red) (rm) (rm) 4. Method and equip 5. Deteo (red) (rm) 6. Beasured audoor arithow (rm) 6. Deteo (red) (rm) <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td></td<>						
Supporting documentation end a A-built and/or design do a A-strature regulated addoor airflow (cm) (cm) cuplement document b. collarized means to mean b. collarized means cuplement b. collarized means cuplement b. collarized means cuplement	Note: MCH-02-A can be performed in					
A-built and/or design de A-built and/or design de A	1. Supporting documentation nee					e (Field Technician).
 analyse analyse anal		Time for outside air damper to stabiliz				
System XA-4 discover and seven posted or make available with the building. A distribute the test total design affrow. Accord VFD spece or make available with the building. A distribute meaning to the construction or installation identified on this Certificate of Acceptance has been posted or make available with the building. A distribute meaning to the construction or installation identified on this Certificate of Acceptance has been posted or make available with the building. A distribute meaning to the construction or installation identified on this Certificate of Acceptance has been posted or make available with the building. A distribute meaning to the construction or installation identified on this Certificate of Acceptance has been posted or make available with the building. A distribute meaning to the construction is provided in the posted or make available with the building. A distribute meaning to the construction is provided in the posted or make available with the building. A distribute meaning to the construction is provided in the certificate of Acceptance and attest to the feal technication is acting on my behalf as my employee or my agent and have reviewed the information provided on this Certificate of Acceptance and attest to the declarations in this Statement (responsible acceptance preson). A technol of delivering outside air damper position stabilizes information provided on this Certificate of Acceptance and attest to the declarations in this Statement (responsible acceptance preson). A technol of delivering outside air damper position stabilizes information provided on this Certificate of Acceptance and attest to the declarations in this Statement (responsible acceptance preson). A technol of delivering outside air damper position stabilizes in the isoftent of the series to the score technol or installation identified on this Certificate of Acceptance and attest to the declarations in this statement (responsible acceptance preson instit). A technol of delivering outside is a d	Start-Up Sheets or Balanc					pplicable acceptance
 c. 2442_2018 building for Enrorg a. Majust supply almol to either the sum total design afforw. accord VTO specificate of acceptance and set of the solution is sumed on the building. b. Calibrated means to make a valiable with the building memot(s) c. Bareard outdoor airflow reading (cf) c. Bequired outdoor airflow (cm) (f/form i d. Time for outside air damper to stabiliz System type (check etter VU) a. Check if Variable in Contention is Acceptance and attest to the solution is antification (fragulation) c. Check if Variable in Contention is A solution in the solution is antification in the composition is antification in the composition in the com		Step 4: VAV testing at reduced supply airflo				this Certificate of Acceptance has
Industry of the biology of the	c. 20132016 Building Energy					
 a. Mathod and equip b. calibrated means to mean i. Method and equip i. Equipment calibrate i. System type (check either VAV a. South and the control of the contr					Field Technician Construer	
i. Method and equip ii. Equipment calibra ii. System type (check either V s. Check if Variable Air Void ii. Outside air damper to stabiliz s. Check if Variable Air Void ii. Outside air damper to dutide air at full supply ii. Outside air damper position stabilizes iii. One of the followine iiii. One of the followine iiii. One of the followine iiii. One of the followine iiiiii. One of the followine iiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii					-	
ii. Equipment calibrat 3. System type (lock kither Vax) a. Check kither Vaxio b. Casting allow in the processing of the procesing of the processing of the processing of the proces			Field Technician Company Name:		Position with Company (Title):	
3. System type (heck either VAY as a. Check either VAY as a. Check either VAY as a. Check either VAY as a check either VAY as a. Outside air dual support of the set of the s	ii. Equipment calibrat		Address:		ATT Certification Identification (if applicat	xie):
i. Outside airfow is e C. Testing Calculations & Results Determine Percent Outside Air 1 full supply ii. Determine Percent Outside Air 1 full supply iii. Determine Percent Outside Air 1 reduced su Determine Perc		Step 5. Retain to initial conditions (circle)	City/State/Zip:		Phone:	Date Signed:
Check iff Determine Percent Outside air at full supply ii. Damper Control [m Dynamic iii. One of the following under the strip the following 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 attracts to the declarations in this statement (responsible acceptance person). Certificate of Acceptance and attracts to 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 attracts to the declarations in this statement (responsible acceptance person). The information provided on this Certificate of Acceptance and states that the construction or installation identified on this Certificate of Acceptance and states to 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. Method of deliving outside ar is durited within 1 PASS. All Construction Inspection resp responsible Acceptance Person Syntare: Return air plenum is provided independer S. Pre-occupancy pure has been of the following methods must a. The conditioned floor are cm per person times the b. a geomplete air chose and counties are inclused in the publicing permit(s) issued for the building permit(s) issued for the building permit(s) issued for the building method with Company (Tite): Responsible Acceptance Person Company Name: Responsible Acceptance Person Syntare: Responsible Acceptance Person Company Name: Responsible Acceptance		C Testing Calculations & Results				
 Check if Constant Air Vota Mothod of delivering outside air damper position stabilizes Constant Air Vota PASS: All Construction Inspection resp (Y-yes) Passe and constant Air Vota Pass	Check if 1			the lowe of the Sta	to of California:	
 b. %OA₁₄ is within 10% of design Outside C. Outside air damper position stabilizes Determine Percent Outside Air at reduced su a. %OA₁₄ = Measured outdoor airflow re b. %OA₁₄ = Measured outdoor airflow re b. %OA₁₄ = Measured outdoor airflow re c. Outside air damper position stabilizes d. Method of delivering outside a Outside air is ducted within 1 PASS: All Construction Inspection Inspection resp (Y- yes) The eccupancy purge has been of the Following Personcipe A corptance Person Signature: Responsible Acceptance Person Signature: Chy/State/Zip: Phone: Dete Signed: 						and I have reviewed the
 C. Outside air damper position stabilizes Determine Percent Outside Air at reduced su Determine Percent Outside Air at reduced su A %OAA, is within 10% of design Outside a, %OAA, is within 10% of design Outside C. Outside air damper position stabilizes A. Check if Constant Air Vol. System design, construction or installation of the acceptance substantiates that the construction or installation identified on this Certificate of Acceptance substantiates that the construction or installation identified on this Certificate of Acceptance substantiates that the construction or installation identified on this Certificate of Acceptance substantiates that the construction or installation identified on this Certificate of Acceptance substantiates that the construction or installation identified on this Certificate of Acceptance substantiates that the construction or installation identified on this Certificate of Acceptance substantiates that the construction or installation identified on this Certificate of Acceptance substantiates that the construction or installation identified on this Certificate of Acceptance substantiates that the construction or installation identified on this Certificate of Acceptance substantiates that the construction or installation identified on this Certificate of Acceptance substantiates that the construction or installation identified on this Certificate of Acceptance substantiates that the construction or installation identified on this Certificate of Acceptance substantiates that the construction or installation identified on this Certificate of Acceptance substantiates that the construction or installation identified on this Certificate of Acceptance substantiates that the construction or installation identified on this Certificate of Acceptance available with the building. I will ensure that a completed and its portion substantificate of Acceptance available to the enforc	Dynamic		information provided on this Certificate of Accepta	tance.		
 Energy B Determine Percent Outside Air at reduced su Bernard						
 Return F, Othek = Measured outdoor airnow reining to the segment of the following methods must a. The conditioned floor are cfm per person times the b. 3 Complete air charge are are are cfm per person times the b. 3 Complete air charge are are are are are are are are are ar		Determine Percent Outside Air at reduced su				
 Injection Injection		a. %OA _{RA} = Measured outdoor airflow rei				
C Outside air damper position stabilizes Appendix NA7. b. Check if constant Air Volu System is 4. Method of delivering outside a Outside air is ducted Within f Within f Within f Within f PASS: All Construction Inspection resp Y(Y yes) Pass: All Construction Inspection resp Y(Y) yes) Pre-occupancy purge has been of the following methods must a. The conditioned floor are cfm per person times the b. b. 3 Complete air ch		b. %OA _{RA} is within 10% of design Outside				
 b. Check if Constant Air Vol System is 4. Method of delivering outside air is ducted Outside air is ducted Within fi Within 1 5. Pre-occupancy purge has been of the following methods must a. The conditioned floor are cfm per person times the b. 3 <u>C</u>omplete air ch 	Dedicate	c. Outside air damper position stabilizes			iquitements and procedures speen	
System is Controls to avoid over ventilation. System is Outside air is ducted Outside air is ducted and is posted of the ductage and available with the building, and made available with the ductage and available with the ductage and available air is ducted, signed copy of this Certificate of Acceptance serves signed copy of this Certificate of Acceptance Person Signeture: Responsible Acceptance Person Signeture: Responsible Acceptanc						this Certificate of Acceptance has
Method of delivering outside a irs ducted Outside a irs ducted Within f Within 1 Within 1 PASS: All Construction Inspection resp provided independer S. Pre-occupancy unge has been of the following methods must a. The conditioned floor are cfm per person times the b. 3 Complete air ch		controls to avoid over ventilation.				available with the building
Within fi PASS: All Construction Inspection resp signed copy of this Certificate of Acceptance is required to be included with the documentation the builder provides to the building owner at occupancy. Return air plenum is provided independer Return air plenum is provided independer Responsible Acceptance Person Name: Responsible Acceptance Person Signature: S. Pre-occupancy purge has been of the following methods must Address: CSLB License: a. The conditioned floor are cfm per person times the b. 3 Complete air ch		D. Contraction				
Within 1 PASS: All Construction Inspection resp (Y - yes) Owner at Occupancy. Return air plenum is provided independer Responsible Acceptance Person Name: Responsible Acceptance Person Signature: 5. Pre-occupancy purge has been of the following methods must Responsible Acceptance Person Company Name: Position with Company (Title): a. The conditioned floor are cfm per person times the b. 3 Complete air ch				quired to be inclu	ded with the documentation the bu	uilder provides to the building
Return air plenum is provided independer Responsible Acceptance Person Company Name: Position with Company (Title): S. Pre-occupancy purge has been of the following methods must Address: CSLB License: a. The conditioned floor are cfm per person times the b. 3 Complete air ch City/State/Zip: Phone: Date Signed:					Responsible Acceptance Person Signature	:
provided independer Pre-occupancy purge has been of the following methods must Pre-occupancy purge has been of the following methods must CSLB License: a. The conditioned floor are cfm per person times the b. 3 Complete air ch City/State/Zip: Phone: Date Signed:	Return air plenum is					
of the following methods must City/State/Zip: Phone: Date Signed: a. The conditioned floor are cfm per person times the City/State/Zip: Phone: Date Signed: b. 3 Complete air ch City/State/Zip: City/State/Zip: City/State/Zip:	provided independer					
a. The conditioned floor are cfm per person times the b. 3 Complete air ch			Address:		CSLB License:	
cfm per person times the b. 3 <u>c</u> omplete air ch			City/State/Zip:		Phone:	Date Signed:
			L		l	l
	b. 3 <u>C</u> omplete air ch					
	CA Building Energy Efficiency Standa					

CA Building Energy Efficiency Standards - 20132016 Nonresidential Compliance

CA Building Energy Efficiency Standards - 201



	STATE OF CALIFORNIA	CERTIFICATE OF ACCEPTANCE- USER INSTRUCTIONS NRCA-MCH-02-A
ALIFORNIA	OUTDOOR AIR ACCEPTAN CEC-NRCA-MCH-02-A (Revised MM/YY)	Outdoor Air Acceptance (Page 1 of 1)
OR AIR ACCEPTANCE	CERTIFICATE OF ACCEPTANCE	NRCA-MCH-02-A User Instructions
MCH-02-A (Revised MM/YY) ATE OF ACCEPTANCE	Outdoor Air Acceptance	NRCA-WCH-02-A Oser Instructions
Air Acceptance	Project Name:	This form is used to document results of the minimum outdoor air ventilation tests for both constant and variable air volume fan
	Project Address:	systems. A separate form should be completed for each system tested. The form is separated into several basic sections:
s:	System Name or Identification/Tag:	construction inspection; functional testing; testing calculations and results; and pass/fail evaluation. Each section consists of a
or Identification/Tag:		combination of data entry requirements and check boxes.
	DOCUMENTATION AUTHOR'S DECLARAT	
	1. I certify that this Certificate of Accep	Section A. Construction Inspection
1.1 Outdoor Air Acceptance Fun	Documentation Author Name:	This pre-test section consists of check boxes and data entry requirements for both constant and variable air
sable demand control ventilation (if	Documentation Author Company Name:	volume systems. Complete only the check boxes associated with the appropriate system type.
rify unit is not in economizer mode	Address:	
ded boxes do not apply for CAV syster		Section B. NA7.5.1.1 Outdoor Air Acceptance - Functional Testing
V and VAV testing at full supply airfl	City/State/Zip:	This section consists of check boxes and data entry requirements for both constant and variable air volume
ust supply air to achieve design airflo lingRecord VFD speed (Hz).	FIELD TECHNICIAN'S DECLARATION STAT	systems. Enter data associated with the appropriate system type as instructed.
asured outdoor airflow reading (cfm)	I certify the following under penalty of pe	Section C. Testing Calculations and Results
uired outdoor airflow (cfm) (from MC	 The information provided on this Cell I am the person who performed the 	<u>Section C. Testing Calculations and Results</u> This section consists of data entry requirements for both constant and variable air volume systems. Enter data
<i>ipment Schedules).</i> Ie for outside air damper to stabilize a	3. The construction or installation iden	associated with the appropriate system type as instructed.
nutes):	indicated in the plans and specificati requirements and procedures specifi	
W testing at reduced supply airflow	4. I have confirmed that the Certificate	Section D. Evaluation
ust supply airflow to either the sum o al design airflowRecord VFD speed (been completed and signed by the re	This section contains check boxes to indicate the pass/fail results of the test(s). Check the appropriate box. An
asured outdoor airflow reading (cfm)	issued for the building. Field Technician Name:	portion that fails should be explained in the given rows.
uired outdoor airflow (cfm) (from MC		
e for outside air damper to stabilize a	Field Technician Company Name:	Declaration Statements
turn to initial conditions (check)	Address:	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
	City/State/Zip:	boxes and data entry requirements, including signature; date; and license number. Complete check boxes and
g Calculations & Results	RESPONSIBLE PERSON'S DECLARATION S	enter data as instructed.
e Percent Outside Air at full supply air	I certify the following under penalty of pe	
ArA = Measured outdoor airflow read	1. I am the Field Technician, or the Field	The Documentation Author is the person completing the form. The Field Technician is responsible for
A _{FA} is within 10% of design Outside Ai	information provided on this Certific 2. I am eligible under Division 3 of the I	performing and documenting the results of the acceptance procedures on the Certificate of Acceptance forms
side air damper position stabilizes wi	system design, construction or instal	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
e Percent Outside Air at reduced supp	identified on this Certificate of Acces	required to have a contractor's, architect's or engineer's license. A Responsible Person is eligible under Divisio
A _{RA} = Measured outdoor airflow read	 The information provided on this Certificate of Acceptance complies w 	3 of the Business and Professions code in the applicable classification to take responsibility for the scope of
A _{RA} is within 10% of design Outside A	enforcement agency, and conforms t	work specified by the Certificate of Acceptance document. The Responsible Person can also perform the field
side air damper position stabilizes wi	Appendix NA7. 4. I have confirmed that the Certificate	testing and verification work, and if this is the case the Responsible Person must complete and sign both the
intent of this test is to ensure that 1) o avoid over ventilation.	 I have commed that the certificate been completed and is posted or ma 	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.
	5. I will ensure that a completed, signed	the Field Technician agent or employee.
ation	permit(s) issued for the building, and signed copy of this Certificate of Acc	
S: All Construction Inspection respon	owner at occupancy.	
yes)	Responsible Acceptance Person Name:	
	Responsible Acceptance Person Company Name:	
	Address:	
	City/State/Zip:	
g Energy Efficiency Standards - 2013	CA Building Energy Efficiency Standards -	
	and senantly creeky condency standards	
		CA Building Energy Efficiency Standards - 20132016 Nonresidential Compliance
g Energy Effi	ciency Standards - 2013	ciency Standards - 2013: CA Building Energy Efficiency Standards



NA7.5.4 Air Economizer Controls Acceptance



	CON	ORNIA IOMIZER CONTROLS ACCEPTAN 05-A (Revised <u>MWYY</u>)	CE	CALIFO	
CERTIFI	CATE	OF ACCEPTANCE			NRCA-MCH-05-A
Air Econ	nomiz	er Controls Acceptance			(Page 1 of 3)
Project Name	e:		Enforc	sement Agency:	Permit Number:
Project Addr	ess:		City:		Zip Code:
		tification/Tag:		n Location or Area Served:	
System Name	e or iden	ufication/Tag:	System	n Location of Area Served:	
		one Certificate of Acceptance for each system that m ompliance.	ust	Enforcement Agency Use: Checked b	y/Date
A. Cons	tructi	ion Inspection			
1. Su	pporti	ing documentation needed to perform test includes	:		
a.		132016 Building Energy Efficiency Standards Nonres Slance).	identi	ial Compliance Manual (NA7.5.4 Air Eco	onomizer Controls Acceptance At-
b.	- 20	Building Energy Efficiency Standards.			
2. Ins	strume	entation to perform test includes:			
a.	Ha	nd-held temperature probe			
		Calibration Date:(must be wit	hin la	st year)	
b.	De	vice capable of calculating enthalpy			
		Calibration Date:(must be with	hin la	st year)	
С.	1.2	kOhm Resistor (when specified by the manufacture	er)		
3. Ins	stallati	ion: (all of the following boxes should be checked)			
		Economizer high limit shutoff control complies wit Section 140.4(e)3.	th Tab	ole 140.4-B found in the 2012 2016 Build	ding Energy Efficiency Standards
		Economizer reliability features are present per 20	13 <u>201</u>	6 Building Energy Efficiency Standards	Section 140.4(e)4:
		a. 5-year manufacturer warranty of econom	izer a	ssembly	
		b. Provide a product specification sheet prov	ving c	apability of at least 60,000 actuations	
		c. Provide a product specification sheet prov in w.gA product specification sheet 3 AMCA Standard 500 or AMCA certificat requirement (Class 1A, 1, and 2 are acc	howin tion b	g the manufacturer's results after follo y a third party under AMCA Publication	wing the testing procedures of
		 d. If the high limit setpoint is fixed dry-bulb or setpoint 	or fixe	ed enthalpy + fixed dry-bulb then the co	ontrol shall have an adjustable
		e. Outdoor air, return air, mixed air, and sup	ply ai	r sensors shall be calibrated as follows:	
		i. Drybulb and wetbulb temperatur	es aco	curate to ±2°F over the range of 40°F to	80°F
		ii. Enthalpy accurate to ±3 Btu/lb o	ver th	e 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(calibration are plotted on the performance)			out values measured during sensor
		g. Sensors used for high limit control shall be shielded from direct sunlight.	e locat	ted to prevent false readings, including	but not limited to being properly
		Unitary systems with an economizer have control compressors off when economizers can provide pa			nermostats, that cycle
		System has return fan speed control, relief dampe economizer mode.	rs, or	dedicated relief fans to prevent buildir	ng over pressurization in full
	٥	For systems with DDC controls, sensor used for ec	onom	izer lockout has been factory or field c	alibrated.
		For systems with non-DDC controls, manufacturer	's sta	rtup and testing procedures have been	applied.

© 2016 NEMIC

NOMIC
NATIONAL ENERGY MANAGEMENT INSTITUTE COMMITTEE

	STATE OF CALIFORNIA AIR ECONOMIZER CONTROLS ACCEPTAN	ICE			
TATE OF CALIFORNIA	CEC-NRCA-MCH-05-A (Revised MM/YY)	CALIF	ORNIA ENERGY COMMISSI		
C-NRCA-MCH-05-A (Revised MM/YY)	CERTIFICATE OF ACCEPTANCE		NRCA-M	ICH-05-A	
ERTIFICATE OF ACCEPTANCE	Air Economizer Controls Acceptance	r		ge 2 of 3)	
ir Economizer Controls Acceptar	Project Name:	Enforcement Agency:	Permit Number:		
oject Name:	Project Address:	City:	Zip Code:		
oject Address:	System Name or Identification/Tag:	System Location or Area Served:			
stem Name or Identification/Tag:		1			
	B. Functional Testing		Re	esults	
ote: Submit one Certificate of Accep	Is the economizer listed in the CEC equipment certification direct	pry? (if yes, proceed to Section D.)	2	(/N	
emonstrate compliance.	Step 1: Disable demand control ventilation systems (if applicable	e)			
Construction Inspection	Step 2: Enable the economizer and simulate a cooling demand la	arge enough to drive the economizer fully o	pen. Verify the following	2	
. Supporting documentation nee	a. Economizer damper modulates 100% open.		1	(/N	
 a. 20132016 Building Energy 	b. Return air damper modulates 100% closed.		,	(/N	
A-Glance). b. <u>20132016</u> Building Energy	c. For systems that meet the criteria of 20132016 Building En the economizer remains 100% open with the use of mecha no longer be met by the economizer alone.			(/N	
Instrumentation to perform tes	d. All applicable fans and dampers operate as intended to ma	intain building pressure		(/N	
a. Hand-held temperature p	e. The unit heating is disabled (if applicable).	and a solution by pressure.		N / NA	
Calibration Date b. Device capable of calculat	Step 3: Disable the economizer and simulate a cooling demand.	Verify the following:			
Calibration Date	a. Economizer damper closes to its minimum position.	terny the following.	1	(/N	
c. 1.2 kOhm Resistor (when	 All applicable fans and dampers operate as intended to maintain building pressure. 				
Installation: (all of the following	C. The unit heating is disabled (if applicable).				
	Step 4: If the unit is equipped with heating, simulate a heating d	emand and enable the economizer. Verify t	he following:		
Economizer high limit	 Economizer damper closes to its minimum position. 			N / NA	
Section 140.4(e)3.	b. Return air damper opens.			N/NA	
 Economizer reliability 	Step 5: Turn off the unit and verify the following:				
a. 5-year manuf	a. Economizer damper closes completely.			(/N	
b. Provide a pro	Step 6: System returned to initial operating conditions			(/N	
c. Provide a pro in w.gA J	Step 0. System returned to initial operating conditions			/	
AMCA Sta	C. Testing Results	· · · ·	PAS	5 / FAIL	
requireme	Step 2: Simulate cooling load and enable the economizer (all answ	vers are Y).		1	
d. If the high lin	Step 3: Simulate cooling load and disable the economizer (all ans	-			
setpoint e. Outdoor air, I	Step 4: Simulate heating demand and enable the economizer (all	answers are Y).			
i. Dryb	Step 5: Turn off the unit (all answers are Y).				
ii. Enti	-		•		
iii. Rel	D. Evaluation				
f. Check that th	PASS: All Construction Inspection responses are complete	and all Testing Results responses are "Pass"	or the economizer is list	ed in the 🚽	
calibration	CEC equipment certification directory.				
g. Sensors used shielded fi					
 Unitary systems with compressors off when 					
 System has return far economizer mode. 					
For systems with DD(
For systems with non	L				

© 2016 NEMIC

CA Building Energy Efficiency Standards - 20122016 Nonresidential Compliance

CA Building Energy Efficiency Standar

<Date>



NA7.5.8 Supply Water Temperature Reset Controls Acceptance

© 2016 NEMIC



STATE OF CALIFORNIA SUPPLY WATER TEMPERATURE RESE CEC-NRCA-MCH-09-A (Revised MW/YY)	ET CONT		ENERGY COMMI	SSION
CERTIFICATE OF ACCEPTANCE				MCH-09-A
Supply Water Temperature Controls Acceptance			(F	age 1 of 3)
Project Name:	Enforcement Agen	ey:	Permit Numb	er:
Project Address:	City:		Zip Code:	
System Name or Identification/Tag:	System Location or	r Area Served:		
Note: Submit one Certificate of Acceptance for each sy that must demonstrate compliance.	ystem	Enforcement Agency Use: Checked by/Date		
Intent: Ensure that both the chilled water and ho outdoor air temperature, as indicated in th		ly temperatures are automatically reset base quences.	d on either build	ling loads or
A. Construction Inspection				
1. Supporting documentation needed to perform test include	des, but not l	imited to:		
a. 20132016 Temperature Reset Controls Acceptance At-A-Gi		al Compliance Manual (NA7.5.8 Supply Wate	er	
2. Instrumentation to perform test includes, but is not limit	ed to:			
a. Calibrated reference temperature sensor, icewa				
	be within las			
3. Document that hydronic system supply temperature sense	sor(s) have b	een factory or field calibrated: (check the fo	lowing that app	ly):
Factory calibrated				
Provide supporting documentation.				
Field-calibrated by Controls contractor or other.				
Calibration complete, hydronic system supply ten Provide supporting documentation.	nperature se	nsors within 1% of calibrated reference sens	or, icewater or o	irywell bath.
B. Functional Testing				Results
Step 1: Test Maximum Reset Value				-
a. Change reset control variable to its maximum value.	This can be a	ccomplished by any one of the following (ch	eck method):	
 Commanding at least one coil valve to 100% op 	en			
 Adjust discharge air temperature or zone temperature 	erature setpo	oints to drive a valve into a 100% open.		
 Override actual outdoor air sensor to exceed m 	aximum wat	er temperature boundary value.		
b. Verify that chilled or hot water temperature setpoint	is reset to ap	propriate value.		Y/N
c. Verify that actual system temperature changes to with	hin 2% of the	e 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				Y/N
 Verify that actual system temperature changes to with 	hin 2% of the	e new setpoint		Y/N
Step 3: Test Automatic Control of Reset Control Variable.		<u> </u>		
a. Restore reset control variable to automatic control				
b. Verify that chilled or hot water temperature setpoint	is reset to ap	propriate value		Y/N
c. Verify that actual supply temperature changes to mee				Y/N
d. Verify that actual supply temperature changes to with	hin 2% of the	new setpoint		Y/N
C. Testing Percette				TAU.
C. Testing Results System passes criteria in 1c, 2c and 3d		· · ·	PASS /	FAIL

© 2016 NEMIC

<Date>



ALIFORNIA ENERGY COMMISSIO

ALC: NO DE	
All shares of the local division of the	
DN	

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

Permit Number: Zip Code:

SUPPLY WATER TEMPER/	CEC-NRCA-MCH-09-A (Revised MW/YY) CERTIFICATE OF ACCEPTANCE		
CEC-NRCA-MCH-09-A (Revised MM/YY)			
CERTIFICATE OF ACCEPTANCE	Supply Water Temperature Controls Project Name:	Acceptance Enforcement Agency:	
Supply Water Temperature Controls Protect Neme:	Project Herrie.	choreanan Agarcy.	
	Project Address:	City:	
Project Address:	System Name or Identification/Tag:	System Location or Area Served:	
System Name or Identification/Tag:			
	D. Evaluation		
Note: Submit one Certificate of Acce	·		-
that must demonstrate compliance.		responses are complete and all Testing Resu	Its response
	Notes:		
Intent: Ensure that both the ch outdoor air temperatur			
outdoor an temperature			
A. Construction Inspection			
1. Supporting documentation needed to			
20132016 Building Energy Eff			
a. Temperature Reset Controls /			
2. Instrumentation to perform test inclu-			
a. Calibrated reference tempera			
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 ten			
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 ten			
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 ten			
c. Verify that actual supply temperate			
d. Verify that actual supply temperati			

CA Building Energy Efficiency Standards -

	1
	/
NATIONAL ENERGY MANAGEMENT INSTITUTE COMMITTE	E

	STATE OF CALIFORNIA	CERT	IFICATE OF ACCEPTANCE- USER INSTRUCTIONS	NRCA-MCH-09-A
STATE OF CALIFORNIA	SUPPLY WATER TEMPERATU	Suppl	ly Water Temperature Controls Acceptance	(Page 1 of 1)
SUPPLY WATER TEMPER	CEC-NRCA-MCH-09-A (Revised MM/YY)			
CEC-NRCA-MCH-09-A (Revised MM/YY)	CERTIFICATE OF ACCEPTANCE		NRCA-MCH-09-A User Instructions	
CERTIFICATE OF ACCEPTANCE	Supply Water Temperature Controls Acce Protect Name:			
Supply Water Temperature Control Project Name:		Section	A. Construction Inspection	
	Project Address:		This pre-test section consists of check boxes and data entry requirements. Complete check boxes	and enter data
Project Address:	System Name or Identification/Tag:		as instructed.	
System Name or Identification/Tag:			D. Functional Texture	
	D. Evaluation	Section	B. Functional Testing This section consists of check boxes and yes or no questions arranged by individual test. Check ea	ch box or circle
Note: Submit one Certificate of Acce	· · · · · · · · · · · · · · · · · · ·		the correct answer for each specific test or line item.	terr box or encie
that must demonstrate compliance.	PASS: All Construction Inspection resp			
	Notes:	Section	n C. Testing Results	
Intent: Ensure that both the c outdoor air temperatu			This section consists of check boxes for each test procedure. Complete check boxes as instructed	-
A. Construction Inspection		Section	D. Evaluation	
1. Supporting documentation needed to			Check the appropriate box as instructed.	
20132016 Building Energy E		Declar	ation Statements of Acceptance	
a. Temperature Reset Controls		Decial	This section contains fillable fields for three declaration statements: one from the Documentation	n Author, one
2. Instrumentation to perform test inclu			from the Field Technician, and one from the Responsible Person. Each area contains a combination	
a. Calibrated reference temper			boxes and data entry requirements, including signature; date; and license number. Complete che	
1. Calibration Date:			enter data as instructed.	
3. Document that hydronic system supp				
Factory calibrated			The Documentation Author is the person completing the form. The Field Technician is responsible	
Provide supporting documen			and documenting the results of the acceptance procedures on the Certificate of Acceptance form	
Field-calibrated by Controls c			Technician must sign the Certificate of Acceptance to certify that the information he or she provi	
Calibration complete, hydron			Certificate of Acceptance is true and correct. It is important to note that the Field Technician is no have a contractor's, architect's or engineer's license. A Responsible Person is eligible under Divisi	
Provide supporting documen			Business and Professions code in the applicable classification to take responsibility for the scope	
R. Functional Testing			specified by the Certificate of Acceptance document. The Responsible Person can also perform th	
B. Functional Testing Step 1: Test Maximum Reset Value			and verification work, and if this is the case the Responsible Person must complete and sign both	the Field
a. Change reset control variable to it			Technician's signature block and the Responsible Person's signature block on the Certificate of A	
· · · ·			The Responsible Person assumes responsibility for the acceptance testing work performed by the	Field
			Technician agent or employee.	
Adjust discharge air temper 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				
	CA Building Energy Efficiency Standards - 201			
	Server St entret Standards	CA Buile	ling Energy Efficiency Standards - 20132016 Nonresidential Compliance	(Date)

© 2016 NEMIC



NA7.5.9 Hydronic System Variable Flow Control Acceptance



STATE OF CALIFORNIA HYDRONIC SYSTEM VARIABLE FLOW CON CEC-NRCA-MCH-10-A (Revised MMYY)	ACCEPTANCE CALIFORNIA ENERGY COMMI					
CERTIFICATE OF ACCEPTANCE		MCH-10-A				
Hydronic System Variable Flow Control Acceptance	. ()	Page 1 of 3)				
Project Name: E	nforcement Agency: Permit Num	ber:				
Project Address: C	Xy: Zip Code:					
System Name or Identification/Tag: System Name or Identification/Tag:	ystem Location or Area Served:					
Note: Submit one Certificate of Acceptance for each system that m demonstrate compliance.	Enforcement Agency Use: Checked by/Date					
tabanta	tion to action and applied to de					
Intent: Ensure that hydronic pump speed varies with build	aing neating and cooling lodas.					
A. Construction Inspection						
 Supporting documentation needed to perform test includes, but 	t not limited to:					
 As-built and/or Design Documents including Mechanical 						
20122016 Building Energy Efficiency Standards Nonresid						
b. Variable Flow Control Acceptance At-A-Glance).						
c. <u>2012/2016</u> Building Energy Efficiency Standards.						
Instrumentation to perform test includes, but not limited to:						
 Calibrated differential pressure gauge (hydronic manom 	neter)					
3. Installation:						
Pressure sensor location, setpoint, and reset control me 140.4(j) 6B.	ets the requirements of <u>20222016</u> Building Energy Efficiency Stand	lards section				
For systems without direct digital control of individual c	oils reporting to the central control panel, differential pressure is n	neasured at				
or near the most remote heat exchanger or the heat exc						
valve requiring the most pressure, and the setpoint is no	with central control panel, the static pressure set point is reset bas o less than 80% open.	sed on the				
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 completeAll pressure sensors ±10% of calibration 	brated 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 des	sign flow					
b. Verify that the operating speed decreases		Y/N				
c. Verify that the current operating speed has not increased (fo		Y/N				
d. Record the system pressure as measured at the control sense						
Note: 2.31 ft w.c. = 1.0 psig						
e. Record the system pressure setpoint (either ft. w.c. or psig)	ft w.c.					
	psig					
f. Is the pressure reading on line 1.d. within 5% of pressure set		Y/N				
g. Did the system operation stabilize within 5 minutes after con	npietion of step 1.a.?	Y/N				
Notes:						
CA Building Energy Efficiency Standards - 20122016 Nonresi	idential Compliance	<date></date>				

© 2016 NEMIC



STATE OF CALIFORNIA HYDRONIC SYSTEM VARIA	CERTIFICATE OF ACCEPTANCE- USER INSTRUCTIONS NRCA-MCH-10-A
CEC-NRCA-MCH-10-A (Revised MMYY)	Hydronic System Variable Flow Control Acceptance (Page 1 of 1)
CERTIFICATE OF ACCEPTANCE	
Hydronic System Variable Flow Contro	NRCA-MCH-10-A User Instructions
Project Name:	
Project Address:	Section A. Construction Inspection
System Name or Identification/Tag:	This pre-test section consists of check boxes and data entry requirements. Complete check boxes and enter data as instructed.
	as instructed.
	Section B. Functional Testing
Note: Submit one Certificate of Acceptance demonstrate compliance.	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.
Intent: Ensure that hydronic pum	
incent. Ensure that hydronic pum	Section C. Testing Results This section consists of check boxes for each test procedure. Complete check boxes as instructed.
A. Construction Inspection	This section consists of check boxes for each test procedure, complete check boxes as instructed.
1. Supporting documentation needed to p	Section D. Evaluation
a. As-built and/or Design Documer	Check the appropriate box as instructed.
20132016 Building Energy Efficience	
b. Variable Flow Control Acceptance	Declaration Statements of Acceptance
c. 20122016 Building Energy Efficient	This section contains fillable fields for three declaration statements: one from the Documentation Author, one
2. Instrumentation to perform test include	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
a. Calibrated differential pressure	enter data as instructed.
3. Installation:	
Pressure sensor location, setpoi	The Documentation Author is the person completing the form. The Field Technician is responsible for performing
140.4(j) 6B. For systems without direct digit	and documenting the results of the acceptance procedures on the Certificate of Acceptance forms. The Field
or near the most remote heat e	Technician must sign the Certificate of Acceptance to certify that the information he or she provides on the
For systems with direct digital c	Certificate of Acceptance is true and correct. It is important to note that the Field Technician is not required to
valve requiring the most pressu	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
Exception taken(Heating hot v	specified by the Certificate of Acceptance document. The Responsible Person can also perform the field testing
4. Document that all control pressure sens	and verification work, and if this is the case the Responsible Person must complete and sign both the Field
Factory calibrated	Technician's signature block and the Responsible Person's signature block on the Certificate of Acceptance form.
Provide supporting documentat	The Responsible Person assumes responsibility for the acceptance testing work performed by the Field
Field calibrated by Controls cont	Technician agent or employee.
Calibration completeAll pressu	
B. Functional Testing	
Step 1: Minimum / Low flow test	
a. Close coil control valves to achieve a	
b. Verify that the operating speed decre	
c. Verify that the current operating spe	
d. Record the system pressure as measure	

© 2016 NEMIC

CA Building Energy Efficiency Standard

Notes:

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

CA Building Energy Efficiency Standards - 20122016 Nonresidential Compliance

<Date>



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



STATE OF CALIFORNIA FAULT DETECTION AND DIAGNOSTI [CEC-NRCA-MCH-12-A (Revised MM/YY)	C S FOR P		ISION UNIT		
CERTIFICATE OF ACCEPTANCE		CALIFOR		CA-MCH-12-A	
Fault Detection and Diagnostics (FDD) for Packaged	Direct Expan:	sion Units		(Page 1 of 3)	
Project Name:			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 syste demonstrate compliance.	m that must	Enforcement Agency Use: Checked by/	Date		
A. Construction Inspection					
1. Prior to functional testing, verify and document the fol	lowing:				
 The Fault Detection and Diagnostics (FDD) has 	rdware is instal	led on the unit.			
The FDD system is certified to the California E	nergy Commiss	sion.			
2. The following air temperature sensors are permanently	y installed:				
Outside Air Sensor					
Supply Air Sensor					
 Return Air Sensor (applicable for differential end) 	economizer ope	eration only)			
B. Functional Testing					
Air Temperature Sensor Failure/Fault					
Step 1: Verify the FDD system indicates normal operation	n				
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 o	ontroller. Verif	fy 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	r), if NRCA-MCH-02-A indicates "pass" the	n verify the follo	wing:	
FDD system indicates normal operation					
Economizer Operation					
Step 1: Coordinate this test with NRCA-MCH-05-A (NA 7. economizer damper by disconnecting the control signal fr 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 Tacting Results				(540	
C. Testing Results Test passes if all boxes are checked under Functional Tes	ting		PASS		
resupasses if all boxes are checked under Pullcholidi les	ung.			-	



STATE OF CALIFORNIA FAULT DETECTION AND DIAGI CEC-NRCA-NCH-12-A (Revised MM/YY)	STATE OF CALIFORNIA FAULT DETECTION AND DIAGNOSTIC CEC-NRCA-MCH-12-A (Revised MWYY) CERTIFICATE OF ACCEPTANCE	CS FOR PACKAGED DIRECT EXPAN	ISION UNITS
CERTIFICATE OF ACCEPTANCE	Fault Detection and Diagnostics (FDD) for Packaged	(Page 2 of 3)	
Fault Detection and Diagnostics (FDD) for F	Project Name:	Enforcement Agency:	Permit Number:
Project Address:	Project Address:	City:	Zip Code:
Project Address:	System Name or Identification/Tag:	System Location or Area Served:	·

Note: Submit one Certificate of Acceptance for a	D Evaluation
demonstrate compliance.	PASS: All Construction Inspection responses are complete and Testing Results is "Pass"
	Notes:
A. Construction Inspection	
1. Prior to functional testing, verify and docume	
The Fault Detection and Diagnostics	
The FDD system is certified to the Ci	
2. The following air temperature sensors are pe	
Outside Air Sensor	

Supply Air Sensor

Return Air Sensor (applicable for dif

B. Functional Testing

System Name or Identification/Tag:

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 sensor

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 contrithe following:

FDD system reports a fault

Step 2: Successfully complete and pass NRCA-N

FDD system reports normal operation

C. Testing Results

Test passes if all boxes are checked under Funct

© 2016 NEMIC

N			ИТ		
					\cup
NATIONAL	ENERGY	MANAGEM	ENT INST	ТИТЕ СОМ	MITTEE

_			
	STATE OF CALIFORNIA	CERTIFICATE OF ACCEPTANCE- USER INSTRUCTIONS	NRCA-MCH-12-A
STATE OF CALIFORNIA	CEC-NRCA-MCH-12-A (Revised MM/YY)	Fault Detection and Diagnostics (FDD) for Packaged Direct Expansion Units	(Page 1 of 1)
FAULT DETECTION AND CEC-NRCA-MCH-12-A (Revised MM/YY)	CERTIFICATE OF ACCEPTANCE	NRCA-MCH-12-A User Instructions	
CERTIFICATE OF ACCEPTANCE	Fault Detection and Diagnostics (FDD) Project Name:	Mich-Mich-12-A Oser Instructions	
Fault Detection and Diagnostics (Project Name:	Project Address:	Section A. Construction Inspection	
Project Address:		This pre-test section consists of check boxes and data entry requirements. Compl as instructed.	ete check boxes and enter data
	System Name or Identification/Tag:	as instructeu.	
System Name or Identification/Tag:		Section B. Functional Testing	
Nata Subarit and Castificate of Assa	D Evaluation	This section consists of check boxes and yes or no questions arranged by individu	al test. Check each box or circle
Note: Submit one Certificate of Acce demonstrate compliance.	PASS: All Construction Inspection res	the correct answer for each specific test or line item.	
	Notes:	Section C. Testing Results	
A. Construction Inspection		This section consists of check boxes for each test procedure. Complete check box	es as instructed.
1. Prior to functional testing, verify a		Section D. Evaluation	
The Fault Detection and I		Check the appropriate box as instructed.	
The FDD system is certific			
2. The following air temperature sen		Declaration Statements of Acceptance	
Outside Air Sensor		This section contains fillable fields for three declaration statements: one from the from the Field Technician, and one from the Responsible Person. Each area conta	
Supply Air Sensor		from the rieid recipician, and one from the Responsible Person. Each area conta boxes and data entry requirements, including signature; date; and license numbe	
Return Air Sensor (applic		enter data as instructed.	
B. Functional Testing			
Air Temperature Sensor Failure/Fau		The Documentation Author is the person completing the form. The Field Technici and documenting the results of the acceptance procedures on the Certificate of A	
Step 1: Verify the FDD system indica		Technician must sign the Certificate of Acceptance procedures on the certificate of A	
Step 2: Disconnect outside air temp		Certificate of Acceptance is true and correct. It is important to note that the Field	Technician is not required to
FDD system reports a fault		have a contractor's, architect's or engineer's license. A Responsible Person is elig	
Step 3: Connect outside air tempera		Business and Professions code in the applicable classification to take responsibilit specified by the Certificate of Acceptance document. The Responsible Person car	
		and verification work, and if this is the case the Responsible Person must complete	
FDD system indicates norm		Technician's signature block and the Responsible Person's signature block on the	
Excess Outside Air		The Responsible Person assumes responsibility for the acceptance testing work p Technician agent or employee.	erformed by the Field
Step 1: Coordinate this test with NR		reclinician agent of employee.	
FDD system indicates norm			
Economizer Operation			
Step 1: Coordinate this test with NR economizer damper by disconnecting the following:			
FDD system reports a fault			
Step 2: Successfully complete and p			
FDD system reports normal			
C. Testing Results			
Test passes if all boxes are checked u			
CA Building Energy Efficiency Star	CA Building Energy Efficiency Standard		

© 2016 NEMIC

CA Building Energy Efficiency Standards - 20122016 Nonresidential Compliance



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

38



AU ZO	NE TE	TIC FAULT DETECTION AND D RMINAL UNITS ACCEPTANCE	IAGNOSTICS FOR AIR HANDLING U				
	CEC-NRCA-MCH-13-A (Revised MMYY) CALIFORNIA ENERGY COMMISSION CERTIFICATE OF ACCEPTANCE NRCA-MCH-13-F						
			r Handling Units and Zone Terminal Units Acceptan				
	ect Name:		Enforcement Agency:	Permit Number:			
Proje	ect Address:		City:	Zip Code:			
Syste	em Name or Ide	ntification/Tag:	System Location or Area Served:				
		one Certificate of Acceptance for each system ti compliance.	hat must Enforcement Agency Use: Checked by/Date				
	intent:	Verify that the system detects common faults	in air handling units and zone terminal units.				
<u> </u>			-				
Α.	Construc	tion Inspection					
1.1	nstrument	ation to perform test includes, but not limited t	0:				
			emented at the building automation system control static	on.			
2.1	nstallation			inducia, an additional			
	3	e functional testing verifies proper installation o tallation checks are required.	f the controls for FDD for air handling units and zone tern	ninal units. No additional			
		•					
в.	Function	al Testing for Air Handling Units					
Tes	Testing of each AHU with FDD controls shall include the following tests:						
Ste	p 1: Senso	or Drift/Failure		-			
a.	Disconn	ect outside air temperature sensor from unit co	ntroller	Y/N			
b.	b. Verify that the FDD system reports a fault Y						
с.	Connect	OAT sensor to the unit controller		Y/N			
d.	Verify t	at FDD indicates normal system operation		Y/N			
Ste	ep 2: Damp	er/Actuator Fault		•			
а.	From th	e control system workstation, command the mix	ing box dampers to full open (100% outdoor air)	Y/N			
b.	Disconn	ect power to the actuator and verify that a fault	is reported at the control workstation	Y/N			
с.	Reconn	ect power to the actuator and command the mix	ing box dampers to full open	Y/N			
d.	Verify t	at the control system does not report a fault	•	Y/N			
e.			ing box dampers to a full-closed position (0% outdoor air	i) Y/N			
f.		ect power to the actuator and verify that a fault		Y/N			
g.		ect power to the actuator and command the dar		Y/N			
ь. h.		hat the control system does not report a fault du		Y/N			
	veny u	as the control system does not report a fault of	and remain operation	./ 8			

NOMIC	
NATIONAL ENERGY MANAGEMENT INSTITUTE COMMITTEE	

STATE OF CALIFORNIA AUTOMATIC FAULT DETI ZONE TERMINAL UNITS /	STATE OF CALIFORNIA AUTOMATIC FAULT DETECTION AND D ZONE TERMINAL UNITS ACCEPTANCE CEC-NRCA-MCH-13-A (Revised MWYY) CERTIFICATE OF ACCEPTANCE		
CEC-NRCA-MCH-13-A (Revised MM/YY)			
CERTIFICATE OF ACCEPTANCE			
Automatic Fault Detection and Dia Project Name:	Project Name:	Enforcement Agency:	Permit Number:
Project Name:	Project Address:	City:	Zip Code:
Project Address:			
System Name or Identification/Tag:	System Name or Identification/Tag:	System Location or Area Served:	
System Name or Identificationy lag:			
Note: Submit one Certificate of Accept	Step 3: Valve/actuator fault		
demonstrate compliance.	a. From the control system workstation, command the he	ating coil valves to full open.	Y/N
Intent: Verify that the system a	b. Disconnect power to the actuator and verify that a fault	is reported	Y/N
	c. Reconnect power to the actuator and command the her	ating coil valve to full open	Y/N
A. Construction Inspection	d. Verify that the control system does not report a fault		Y/N
1. Instrumentation to perform test inc	e. From the control system workstation, command the co	oling coil valve to the full open position.	Y/N
a. No instrumentation is required.	f. Disconnect power to the actuator and verify that a fault	is reported	Y/N
The functional testing verific	g. Reconnect power to the actuator and command the co	oling coil valve to full open	Y/N
• installation checks are requi	h. Verify that the control system does not report a fault		Y/N
B. Functional Testing for Air Hand	Step 4: Inappropriate simultaneous heating, mechanical co	oling, and/or economizing	
Testing of each AHU with FDD controls	From the control system workstation, override the heat	ing coil valve and verify that a fault is reported at the con	itrol
Step 1: Sensor Drift/Failure	a. workstation		Y/N
a. Disconnect outside air temperatu	 From the control system workstation, override the cool workstation 	ing coil valve and verify that a fault is reported at the con	trol Y/N
b. Verify that the FDD system repor	C C	ng box dampers and verify that a fault is reported at the o	control Y/N
c. Connect OAT sensor to the unit c	workstation		
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

NOMIC	
NATIONAL ENERGY MANAGEMENT INSTITUTE COMMITTEE	

-	STATE OF CALIFORNIA	STATE OF CALIFORNIA AUTOMATIC FAULT DETECTION AND DIA	AGNOSTICS FOR AIR HANDLING UNI	TS AND
STATE OF CALIFORNIA	AUTOMATIC FAULT DETEC	ZONE TERMINAL UNITS ACCEPTANCE		
AUTOMATIC FAULT DET	ZONE TERMINAL UNITS AC	CEC-NRCA-MCH-13-A (Revised MMYY) CERTIFICATE OF ACCEPTANCE	CALIFORNIA ENE	RGY COMMISSION WIRCA-MCH-13-A
ZONE TERMINAL UNITS	CEC-NRCA-MCH-13-A (Revised MM/YY) CERTIFICATE OF ACCEPTANCE	Automatic Fault Detection and Diagnostics (FDD) for Air I	Handling Units and Zone Terminal Units Accentance	(Page 3 of 5)
CEC-NRCA-MCH-13-A (Revised MM/YY) CERTIFICATE OF ACCEPTANCE	Automatic Fault Detection and Diagno			ermit Number:
Automatic Fault Detection and Di	Project Name:			
Project Name:	Project Address:	Project Address:	City: 2	lp Code:
Project Address:		System Name or identification/Tag:	System Location or Area Served:	
System Name or Identification/Tag:	System Name or Identification/Tag:			
		C. Functional Testing for Zone Terminal Units		
Note: Submit one Certificate of Accep demonstrate compliance.	Step 3: Valve/actuator fault	Testing shall be performed on one of each type of terminal unit shall be tested.	t (VAV box) in the project. A minimum of 5% of the termina	al boxes Results
demonstrate compnance.	a. From the control system workstation	Step 1: Sensor drift/failure		
Intent: Verify that the system	b. Disconnect power to the actuator an c. Reconnect power to the actuator and	a. Disconnect the tubing to the differential pressure sensor	of the VAV box	Y/N
A. Construction Inspection	d. Verify that the control system does n	b. Verify that control system detects and reports the fault		Y/N
1. Instrumentation to perform test in		c. Reconnect the sensor and verify proper sensor operation		Y/N
a. No instrumentation is requ	e. From the control system workstation f. Disconnect power to the actuator an	d. Verify that the control system does not report a fault		Y/N
2. Installation The functional testing verif	· · · ·	Step 2: Damper/actuator fault – damper stuck open		
a. installation checks are requ	g. Reconnect power to the actuator and h. Verify that the control system does n	a. Command the damper to be fully open		Y/N
B. Functional Testing for Air Hand	Step 4: Inappropriate simultaneous heati	b. Disconnect the actuator to the damper		Y/N
Testing of each AHU with FDD contro	From the control system workstation	Adjust the cooling setpoint so that the room temperature	e is below the cooling setpoint to command the damper to	the
Step 1: Sensor Drift/Failure	a. workstation	c. minimum position. Verify that the control system reports	s a fault	Y/N
a. Disconnect outside air temperat	b. From the control system workstation workstation	d. Reconnect the actuator and restore to normal operation		Y/N
b. Verify that the FDD system repo	c. From the control system workstation workstation	Step 3: Damper/actuator fault – damper stuck closed		
c. Connect OAT sensor to the unit	WORSCHUIT	a. Set the damper to the minimum position		Y/N
d. Verify that FDD indicates norma		b. Disconnect the actuator to the damper		Y/N
Step 2: Damper/Actuator Fault		c. Set the cooling setpoint below the room temperature to fault	simulate a call for cooling. Verify that the control system r	reports a Y / N
a. From the control system workst b. Disconnect power to the actuate		d. Reconnect the actuator and restore to normal operation		Y/N
c. Reconnect power to the actuato		Step 4: Valve/actuator fault (For systems with hydronic rehea	it)	
d. Verify that the control system d		a. Command the reheat coil valve to (full) open		Y/N
e. From the control system workst		b. Disconnect power to the actuator. Set the heating setpoi to command the valve closed. Verify that the fault is repo	int temperature to be lower than the current space temper orted at the control workstation	rature, Y/N
f. Disconnect power to the actuate		c. Reconnect the actuator and restore normal operation		Y/N
g. Reconnect power to the actuato		Step 5: Feedback loop tuning fault (unstable airflow)		
h. Verify that the control system d		a. Set the integral coefficient of the box controller to a valu simulate a call for cooling.	e 50 times the current value. Lower the space cooling setp	oint to
		b. The damper cycles continuously and airflow is unstable.	Verify that the control system detects and reports the fault	t Y/N
		c. Reset the integral coefficient of the controller to the orig	inal value to restore normal operation	Y/N
		Step 6: Disconnected inlet duct		
		a. From the control system workstation, command the dam	nper to minimum position.	Y/N
		b. Disconnect power to the actuator and verify that a fault i	is reported at the control workstation.	Y/N
		c. Reset the space temperature setpoint back to its original	value.	Y/N
CA Building Energy Efficiency Standar		· · ·		

CA Building Energy Efficiency Standards - 2

© 2016 NEMIC

CA Building Energy Efficiency Standards - 20132016 Nonresidential Compliance

41



		STATE OF CALIFORNIA	STATE OF CALIFORNIA AUTOMATIC FAULT DETECTION AND D	IAGNOSTICS FOR AIR HANDLING UI	NITS AND	
	STATE OF CALIFORNIA	AUTOMATIC FAULT DETECT	ZONE TERMINAL UNITS ACCEPTANCE CEC-NRCA-MCH-13-A (Revised MMYY)	CALIFORNIA F	NERGY COMMISSIO	N COM
STATE OF CALIFORNIA	AUTOMATIC FAULT DETE	ZONE TERMINAL UNITS ACC CEC-NRCA-MCH-13-A (Revised MM/YY)	CERTIFICATE OF ACCEPTANCE		NRCA-MC	H-13-A
AUTOMATIC FAULT D	ZONE TERMINAL UNITS A CEC-NRCA-MCH-13-A (Revised MM/YY)	CERTIFICATE OF ACCEPTANCE	Automatic Fault Detection and Diagnostics (FDD) for Ai	r Handling Units and Zone Terminal Units Acceptance		4 of 5)
ZONE TERMINAL UNIT CEC-NRCA-MCH-13-A (Revised MM/YY)	CERTIFICATE OF ACCEPTANCE	Automatic Fault Detection and Diagnos	Project Name:	Enforcement Agency:	Permit Number:	
CERTIFICATE OF ACCEPTANCE	Automatic Fault Detection and Diag	Project Name:	Project Address:	City:	Zip Code:	
Automatic Fault Detection and	Project Name:	Project Address:	Project Address.	City.	2000	
Project Name:	Project Address:		System Name or Identification/Tag:	System Location or Area Served:		
Project Address:	System Name or Identification/Tag:	System Name or Identification/Tag:				
System Name or Identification/Tag:			D. Testing Results		PASS / I	FAIL
		C. Functional Testing for Zone Termi	Test passes if all applicable answers are yes under Functional	Testing Sections		
Note: Submit one Certificate of Ac	Step 3: Valve/actuator fault	Testing shall be performed on one of each t				
demonstrate compliance.	a. From the control system workstat	shall be tested. Step 1: Sensor drift/failure	E. Evaluation			
Intent: Verify that the syst	b. Disconnect power to the actuator	a. Disconnect the tubing to the different	PASS: All Construction Inspection responses are compl	ete and all Testing Results responses are "Pass"		
	c. Reconnect power to the actuator	b. Verify that control system detects and				
A. Construction Inspection	d. Verify that the control system doe					
1. Instrumentation to perform tes a. No instrumentation is re	e. From the control system workstat	c. Reconnect the sensor and verify prop				
2. Installation	f. Disconnect power to the actuator	d. Verify that the control system does no				
a. The functional testing v installation checks are r	g. Reconnect power to the actuator	Step 2: Damper/actuator fault – damper st				
	h. Verify that the control system doe	a. Command the damper to be fully ope				
B. Functional Testing for Air H	Step 4: Inappropriate simultaneous he	b. Disconnect the actuator to the dampe				
Testing of each AHU with FDD con	a. From the control system workstat workstation	Adjust the cooling setpoint so that the minimum position. Verify that the cor				
Step 1: Sensor Drift/Failure	From the control system workstat	d. Reconnect the actuator and restore to				
a. Disconnect outside air temp	b. workstation From the control system workstat	Step 3: Damper/actuator fault – damper st				
b. Verify that the FDD system r c. Connect OAT sensor to the u	c. workstation	a. Set the damper to the minimum posit				
d. Verify that FDD indicates nor		· · · · · · · · · · · · · · · · · · ·				
Step 2: Damper/Actuator Fault		b. Disconnect the actuator to the dampe Set the cooling setpoint below the roc				
· · ·		c. fault				
a. From the control system wor		d. Reconnect the actuator and restore to				
b. Disconnect power to the actu		Step 4: Valve/actuator fault (For systems w				
d. Verify that the control syster		a. Command the reheat coil valve to (ful				
e. From the control system wo		Disconnect power to the actuator. Set				
f. Disconnect power to the act		to command the valve closed. Verify t				
g. Reconnect power to the actu		c. Reconnect the actuator and restore n Step 5: Feedback loop tuning fault (unstabl				
h. Verify that the control syster		Set the integral coefficient of the box				
II. Forty date the control system		a. simulate a call for cooling.				
		b. The damper cycles continuously and a				
		c. Reset the integral coefficient of the co				
		Step 6: Disconnected inlet duct				
		a. From the control system workstation,				
		b. Disconnect power to the actuator and				
		c. Reset the space temperature setpoint				
CA Building Energy Efficiency Stan						
	CA Building Energy Efficiency Standards					
		CA Building Energy Efficiency Standards - 20				
			I			

42



		_		F
			STATE OF CALIFORNIA	CERTIFICATE OF ACCEPTANCE – USER INSTRUCTIONS NRCA-MCH-13-/
		STATE OF CALIFORNIA	AUTOMATIC FAULT DETECT	Automatic Fault Detection and Diagnostics (FDD) for Air Handling Units and Zone Terminal Units Acceptance (Page 1 of 1)
	STATE OF CALIFORNIA	AUTOMATIC FAULT DETI	ZONE TERMINAL UNITS AC(CEC-NRCA-MCH-13-A (Revised MM/YY)	
STATE OF CALIFORNIA	AUTOMATIC FAULT D	ZONE TERMINAL UNITS / CEC-NRCA-MCH-13-A (Revised MMYY)	CERTIFICATE OF ACCEPTANCE	NRCA-MCH-13-A User Instructions
AUTOMATIC FAUL	ZONE TERMINAL UNI CEC-NRCA-MCH-13-A (Revised MM/Y)	CERTIFICATE OF ACCEPTANCE	Automatic Fault Detection and Diagnos	Section A. Construction Inspection
ZONE TERMINAL U CEC-NRCA-MCH-13-A (Revised)	CERTIFICATE OF ACCEPTANCE	Automatic Fault Detection and Dia	Project Name:	This pre-test section consists of check boxes and data entry requirements. Complete check boxes and enter data
CERTIFICATE OF ACCEPT/	Automatic Fault Detection and	Project Name:	Project Address:	as instructed.
Automatic Fault Detectio	Project Name:	Project Address:		
Project Name:	Project Address:	System Name or Identification/Tag:	System Name or Identification/Tag:	Sections B. Functional Testing for Air Handling Units
Project Address:	System Name or Identification/Tag:	System Name or Identificationy rag.		This section consists of check boxes and yes or no questions arranged by individual test. Check each box or circle
System Name or Identification/Tag:			D. Testing Results	the correct answer for each specific test or line item.
		C. Functional Testing for Zone 1	Test passes if all applicable answers are yes	Sections C. Functional Testing for Zone Terminal Units
Note: Submit one Certificate	Step 3: Valve/actuator fault	Testing shall be performed on one of e shall be tested.		This section consists of check boxes and yes or no questions arranged by individual test. Check each box or circle
demonstrate compliance.	a. From the control system wo	Step 1: Sensor drift/failure	E. Evaluation	the correct answer for each specific test or line item.
Intent: Verify that th	b. Disconnect power to the act		PASS: All Construction Inspection res	
	c. Reconnect power to the act	a. Disconnect the tubing to the diff		Section D. Testing Results
A. Construction Inspecti	d. Verify that the control syste	b. Verify that control system detect		This section consists of check boxes for each test procedure. Complete check boxes as instructed.
1. Instrumentation to perfo	e. From the control system wo	c. Reconnect the sensor and verify		Section E Evolution
a. No instrumentati	f. Disconnect power to the act	d. Verify that the control system do		Section E. Evaluation Check the appropriate box as instructed.
2. Installation The functional te	g. Reconnect power to the act	Step 2: Damper/actuator fault – damp		check the appropriate box as instructed.
a. installation check	· · ·	a. Command the damper to be full		Declaration Statements of Acceptance
	h. Verify that the control syste			This section contains fillable fields for three declaration statements: one from the Documentation Author, one
B. Functional Testing for Testing of each AHU with FI	Step 4: Inappropriate simultaneo	b. Disconnect the actuator to the d Adjust the cooling setpoint so th		from the Field Technician, and one from the Responsible Person. Each area contains a combination of check
Step 1: Sensor Drift/Failure	a. From the control system wo workstation	c. minimum position. Verify that th		boxes and data entry requirements, including signature; date; and license number. Complete check boxes and enter data as instructed.
a. Disconnect outside air	From the control system wo	d. Reconnect the actuator and rest		enter data as instructed.
b. Verify that the FDD sy:	From the control system wo	Step 3: Damper/actuator fault – dam		The Documentation Author is the person completing the form. The Field Technician is responsible for performin
c. Connect OAT sensor to	c. workstation			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
d. Verify that FDD indicat		b. Disconnect the actuator to the d		Certificate of Acceptance is true and correct. It is important to note that the Field Technician is not required to
Step 2: Damper/Actuator F		c. Set the cooling setpoint below the fault		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
a. From the control syste		d. Reconnect the actuator and rest		specified by the Certificate of Acceptance document. The Responsible Person can also perform the field testing
b. Disconnect power to t		Step 4: Valve/actuator fault (For syste		and verification work, and if this is the case the Responsible Person must complete and sign both the Field
c. Reconnect power to th				Technician's signature block and the Responsible Person's signature block on the Certificate of Acceptance form
d. Verify that the control		a. Command the reheat coil valve t		The Responsible Person assumes responsibility for the acceptance testing work performed by the Field
e. From the control syste		 Disconnect power to the actuate to command the valve closed. Ve 		Technician agent or employee.
f. Disconnect power to t		c. Reconnect the actuator and rest		
g. Reconnect power to th		Step 5: Feedback loop tuning fault (un		
h. Verify that the control		Set the integral coefficient of the		
L		simulate a call for cooling.		
		b. The damper cycles continuously		
		c. Reset the integral coefficient of		
		Step 6: Disconnected inlet duct		
		a. From the control system worksta		
		b. Disconnect power to the actuato		
		· · ·		
		c. Reset the space temperature set		
CA Building Energy Efficience				
	CA Building Energy Efficiency Star			
		CA Building Energy Efficiency Standard		
			CA Building Energy Efficiency Standards - 24	
				CA Building Energy Efficiency Standards - 20132016 Nonresidential Compliance



NA7.5.14 Thermal Energy Storage (TES) System Acceptance



CEC-NRCA-MCH-15-A (Revised MMYY) CERTIFICATE OF ACCEPTANCE		Cres or a	A ENERGY COMMISSION NRCA-MCH-15-A
Thermal Energy Storage (TES) System Acceptance			(Page 1 of 4)
Project Name:	Enforcemen	nt Agency:	Permit Number:
Project Address:	City:		Zip Code:
System Name or Identification/Tag:	System Loc	ation or Area Served:	
Note: Submit one Certificate of Acceptance for each that must demonstrate compliance.		Enforcement Agency Use: Checked by/Date	
Intent: Verify proper operation of distribu	ted energy	y storage TES systems.	
A. Construction Inspection			
1. Supporting documentation needed to perform te	est includes	:	
a. Construction documents (plans, drawings, e	quipment s	chedule, etc.)	
b. Approved submittals (for chillers, storage ta	nks, contro	ls)	
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 ti System parameters. Information is likely to be foun	-		document the key TES
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 capacity (tons) @ temp. Discharge mode efficiency (kW/ton or EER)@ design ambient temp.			
Discharge mode efficiency (kW/ton or EER)@			



	THERMAL ENERGY STORAGE (TES) S CEC-NRCA-MCH-15-A (Revised MMYY)	GYSTEM ACCEPTANCE CALIFORNIA ENER	GY COMMISSION		
HERMAL ENERGY STORAGE (C-NRCA-MCH-15-A (Revised MMYY)	CERTIFICATE OF ACCEPTANCE		NRCA-MCH-15-		
ERTIFICATE OF ACCEPTANCE	Thermal Energy Storage (TES) System Acceptance (Page 2 of				
ermal Energy Storage (TES) System Accep	Project Name:	Enforcement Agency:	Permit Number:		
ect Name:	Project Address:	City:	Zip Code:		
ect Address:	System Name or Identification/Tag:	System Location or Area Served:			
tem Name or Identification/Tag:					
te: Submit one Certificate of Acceptance	2. Storage				
at must demonstrate compliance.	The an Orithment Male	Type (Check):			
	Ice-on-Coil Internal Melt Ice-on-Coil External Melt	Chilled Water Brine (or chilled water wa	(محمد المالية المراجع		
ntent: Verify proper operation of a	Encapsulated (e.g. ice balls)	Brine (or chilled water w Eutectic Salt	with additives)		
	□ Ice Harvester	Clathrate Hydrate Slurry	(CHS)		
Construction Inspection		□ Cryogenic	()		
Supporting documentation needed to per	Other Phase Change Material (e.g. paraffin)	Other (specify:			
a. Construction documents (plans, drav	Brand and Model				
b. Approved submittals (for chillers, sto					
c. Copy of manufacturers' product liter	Number of tanks				
d. Copy of Title 24 code	If custom tanks used, specify height/width/depth				
e. Copy of pertinent appendices to Title	or height/diameter				
	Storage capacity per tank (ton-hours) @				
System Installation Information	entering/leaving temp. and hours discharged				
he following information for both the chille stem parameters. Information is likely to l	Storage rate (tons) @ flow rate (gpm) per tank				
Chiller(s)	Minimum charging temp. based on chiller and				
rand and Model:	tank selections:				
ype (Centrifugal, Reciprocating, etc) and (q	Discharge rate (tons) @ entering/leaving temp. and hours discharged:				
leat rejection type (air, water, other)			,		
harge mode capacity (tons) @ avg. fluid te	C. Functional Testing		Results		
ischarge mode capacity (tons) @ temp.	Step 1: TES System Design Verification				
ischarge mode efficiency (kW/ton or EER)		information, which verifies proper installation of the TE	S System		
esign ambient temp.	components, consistent with system design expectat a. Chiller(s) start-up procedure has been complete		Y/N		
narge mode efficiency @ nighttime design	b. System fluid test and balance has been complete		Y/N		
nbient temp. (kW/ton or EER)		teu	Y/N		
uid type and percentage (nameplate)	C. Air separation and purge has been completed d. Fluid (e.g. glycol) has been verified at the concentration and type indicated on the design documents				
			Y/N Y/N		
		-			
		-	Y/N Y/N		
	g. The system is in a partial charge state in prepar		Y/N		
	h. Schedule of operation has been activated as designed i. Mode documentation describes the state of system components in each mode of operation Step 2: TES System Controls and Operation Verification				
		a. The TES system and the chilled water plant is controlled and monitored by an EMS.			
	a. The TES system and the chilled water plant is co	ontrolled and monitored by an EMS.	🗆 Pass / 🗆 Fail		
	a. The TES system and the chilled water plant is co The system has controls in place that are config b.				

© 2016 NEMIC

NOMIC	
NATIONAL ENERGY MANAGEMENT INSTITUTE COMMITTEE	

	_						
			OF CALIFORNIA				
	STATE OF CALIFORNIA	THERMAL ENERGY STORAGE (TES) SYSTEM ACCEPTANCE [CEC-NRCA-MCH-15-A (Revised MWYY) CALIFORNIA ENERGY CALIFORNIA ENERGY					
STATE OF CALIFORNIA	THERMAL ENERGY STORAGE (TES	·	IFICATE OF ACCEPTANCE	CALIFORNIA ENER	NRCA-MCH-15-A		-15-4
THERMAL ENERGY STORAGE (TI CEC-NRCA-MCH-15-A (Revised MM/YY)	CEC-NRCA-MCH-15-A (Revised MM/YY) CERTIFICATE OF ACCEPTANCE		mal Energy Storage (TES) System Acceptance	•	(Page 3 of 4)		
CERTIFICATE OF ACCEPTANCE	Thermal Energy Storage (TES) System Acceptance	Project N		Enforcement Agency:	Permit Number:		,
Thermal Energy Storage (TES) System Accepta	Project Name:	Burlant 4	Project Address: City:		Zip Code:		
Project Name:	Project Address:						
Project Address:	System Name or Identification/Tag:	System Name or identification/Tag: System Location or Area Served:					
System Name or Identification/Tag:							
			For scheduled operation, note the times when the	system will be in each mode of operation below	Pass	Fail	N/A
	2. Storage						
Note: Submit one Certificate of Acceptance for that must demonstrate compliance.		Storage/charge mode. Manually select storage mode. Verify that the TES system stores energy. c. If scheduled, force the time between(am/pm) and(am/pm). Verify that the TES system					
that must demonstrate compliance.	Ice-on-Coil Internal Melt		stores energy.				
Intent: Verify proper operation of dist	Ice-on-Coil External Melt						
	Encapsulated (e.g. ice balls)		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.				
A. Construction Inspection	Ice Harvester			nually select storage only discharge mode. Verify that			
1. Supporting documentation needed to perfor	Ice Slurry		e. 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.				
	Other Phase Change Material (e.g. paraffin)						
a. Construction documents (plans, drawin	Brand and Model	1					
b. Approved submittals (for chillers, stora			Mechanical cooling only mode. Generate a call for	or cooling. Manually select mechanical cooling only			
c. Copy of manufacturers' product literatu	Number of tanks		mode and verify that the storage does not discharge and the cooling load is met by the compressor f. 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				
d. Copy of Title 24 code	If custom tanks used, specify height/width/depth	f.					
e. Copy of pertinent appendices to Title 2	or height/diameter						
	Storage capacity per tank (ton-hours) @		compressor(s) only. Discharge and mechanical cooling mode. Conesa	to a call for cooling. Manually colort discharge and			
B. System Installation Information	entering/leaving temp. and hours discharged		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				
The following information for both the chiller c System parameters. Information is likely to be	Storage rate (tons) @ flow rate (gpm) per tank			ed, force the time to be between(am/pm) and			
1. Chiller(s)	Minimum charging temp. based on chiller and		· · · · · · · · · · · · · · · · · · ·	starts discharging with the compressor(s) sharing the load.			
Brand and Model:	tank selections:		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				
	Discharge rate (tons) @ entering/leaving temp.	I h					
Type (Centrifugal, Reciprocating, etc) and (qty	and hours discharged:	1					
Heat rejection type (air, water, other)		· · ·	does not discharge and all compressors are off, re				
Charge mode capacity (tons) @ avg. fluid temp	C. Functional Testing			le have been made by the system designer, verify			
	Step 1: TES System Design Verification		cooling and entering the charge mode either mar	active cooling load, simulated by generating a call for		_	
Discharge mode capacity (tons) @ temp.	The installing contractor(s) shall certify the followi		If the system disallows this mode of operation, ve				
Discharge mode efficiency (kW/ton or EER)@ design ambient temp.	components, consistent with system design expec		discontinued while an active cooling load is prese				
Charge mode efficiency @ nighttime design	a. Chiller(s) start-up procedure has been compl		and a prese				
ambient temp. (kW/ton or EER)	b. System fluid test and balance has been comp	D D	aluation (check one)				
Fluid type and percentage (nameplate)	c. Air separation and purge has been complete	· · ·					
······································	d. Fluid (e.g. glycol) has been verified at the cor		ASS: Construction Inspection responses are comp	plete and all applicable tests in step 2 pass.			
	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	L					
	The parton has controls in place that are con						

CA Building Energy Efficiency Standards - 20132016

CA Building Energy Efficiency Standards - 20132016 Non

The system has controls in place that are con

manually select each mode of

b.

CA Building Energy Efficiency Standards - 20132016 Nonresidential Compliance

<Date>



			CERTIFICATE OF ACCEPTANCE – USER INSTRUCTIONS NRCA-MCH-15-A
		STATE OF CALIFORNIA THERMAL ENERGY STORAGE (TI	Thermal Energy Storage (TES) System Acceptance (Page 1 of 1)
	STATE OF CALIFORNIA THERMAL ENERGY STORAGE	CEC-NRCA-MCH-15-A (Revised MM/YY)	
STATE OF CALIFORNIA THERMAL ENERGY STORA	CEC-NRCA-MCH-15-A (Revised MMYY)	CERTIFICATE OF ACCEPTANCE	NRCA-MCH-15-A User Instructions
CEC-NRCA-MCH-15-A (Revised MMYY)	CERTIFICATE OF ACCEPTANCE	Thermal Energy Storage (TES) System Accepta	
CERTIFICATE OF ACCEPTANCE	Thermal Energy Storage (TES) System Acce	Project Name:	Section A. Construction Inspection
Thermal Energy Storage (TES) System	Project Name:	Project Address:	This pre-test section consists of check boxes and data entry requirements. Complete check boxes and enter
Project Name:	Project Address:		data as instructed.
Project Address:	System Name or Identification/Tag:	System Name or Identification/Tag:	
System Name or Identification/Tag:			Section 8. Functional Testing
		For scheduled operation, note the times w	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.
Note: Submit one Certificate of Accept	2. Storage	Storage/charge mode. Manually select st	circle the correct answer for each specific test of fine item.
that must demonstrate compliance.		 c. If scheduled, force the time between 	Section C. Testing Results
	Ice-on-Coil Internal Melt	stores energy.	This section consists of check boxes for each test procedure. Complete check boxes as instructed.
Intent: Verify proper operatio	Ice-on-Coil External Melt	End of charge signal. Simulate a full stora	
	Encapsulated (e.g. ice balls)	recommended end of charge output sens	Section D. Evaluation
A. Construction Inspection	Ice Harvester	Discharge mode. Generate a call for cool	Check the appropriate box as instructed.
1. Supporting documentation needed	Ice Slurry Other Phase Change Material (e.g. paraf	the TES system starts discharging with th	
a. Construction documents (plans		scheduled, force the time to be between	Declaration Statements of Acceptance
b. Approved submittals (for chille	Brand and Model	starts discharging with the compressors of Mechanical cooling only mode. Generate	This section contains fillable fields for three declaration statements: one from the Documentation Author, one
c. Copy of manufacturers' produc	Number of tanks	mode and verify that the storage does no	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
d. Copy of Title 24 code	If custom tanks used, specify height/width	f. only. Return to the off/secured mode. If :	boxes and data entry requirements, including signature, date, and license number. Complete check boxes and enter data as instructed.
e. Copy of pertinent appendices t	or height/diameter	(am/pm) and verify that the storage c	enter data as instructed.
· · · · · · · · · · · · · · · · · · ·	Storage capacity per tank (ton-hours) @	compressor(s) only.	The Documentation Author is the person completing the form. The Field Technician is responsible for
B. System Installation Information	entering/leaving temp. and hours discharg	Discharge and mechanical cooling mode	performing and documenting the results of the acceptance procedures on the Certificate of Acceptance forms.
The following information for both the	Storage rate (tons) @ flow rate (gpm) per	g. In the second	The Field Technician must sign the Certificate of Acceptance to certify that the information he or she provides
System parameters. Information is like	Minimum charging temp. based on chiller	(am/pm) and verify that the storage s	on the Certificate of Acceptance is true and correct. It is important to note that the Field Technician is not
1. Chiller(s)	tank selections:	Off/storage-secured mode. Manually sel	required to have a contractor's, architect's or engineer's license. A Responsible Person is eligible under Division
Brand and Model:	Discharge rate (tons) @ entering/leaving t	does not discharge and all compressors a h.	3 of the Business and Professions code in the applicable classification to take responsibility for the scope of
Type (Centrifugal, Reciprocating, etc)	and hours discharged:	scheduled, force the time to be between	work specified by the Certificate of Acceptance document. The Responsible Person can also perform the field
Heat rejection type (air, water, other)		does not discharge and all compressors a	testing and verification work, and if this is the case the Responsible Person must complete and sign both the
Charge mode capacity (tons) @ avg. fl	C. Functional Testing	Charge plus cool mode. If provisions for t	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 b
Discharge mode capacity (tons) @ ter	Step 1: TES System Design Verification	that the tank(s) can be charged while sen i. cooling and entering the charge mode eit	the Field Technician agent or employee.
Discharge mode efficiency (kW/ton or	The installing contractor(s) shall certify the	If the system disallows this mode of oper	
design ambient temp.	components, consistent with system desig	discontinued while an active cooling load	
Charge mode efficiency @ nighttime (a. Chiller(s) start-up procedure has bee	<u> </u>	
ambient temp. (kW/ton or EER)	b. System fluid test and balance has be	D. Evaluation (check one)	
Fluid type and percentage (nameplate	c. Air separation and purge has been co	· · ·	
	d. Fluid (e.g. glycol) has been verified a	PASS: Construction Inspection responses a	
	e. The TES system has been fully charge		
	f. The system has been partially discha		
	g. The system is in a partial charge state		
	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		
	The system has controls in place that		
	b. manually select each		
	· · · · · · · · · · · · · · · · · · ·		
CA Building France Officiant Standard			
CA Building Energy Efficiency Standards - 4			
	CA Building Energy Efficiency Standards - 2013		
		CA Building Energy Efficiency Standards - 20132016	

<Date>



The latest version of the Mechanical Acceptance Forms can be downloaded from the CEC website at <u>http://www.energy.ca.gov/2015publications/CEC-400-</u> 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 <u>not</u> accept paper copies of the document.
- 3. Email the completed document to <u>administrator@attcp.org</u>.

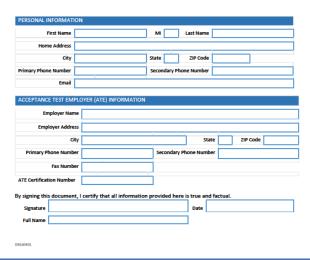


2016 Mechanical Acceptance Test Employer Recertification Statement

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 <u>administrator@attcp.org</u>.

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 l, hereby acknowledge that I meet all qualifications and requirements as for initial certification.





Thank you!