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2013 Building Energy Efficiency Standards Non-Residential HVAC Alterations



BUSINESS AND PROFESSIONS CODE, SECTION 7110

Willful or deliberate disregard and violation of the building laws, including the California Building Code, and local permit requirements constitutes a cause for disciplinary action from the Contractors State License Board working in conjunction with the local building department. This action may consist of fines up to \$5,000 per violation or suspension/revocation of a contractor's license.

WHEN IS A PERMIT REQUIRED?

A written construction permit shall be obtained from the enforcement agency prior to the erection, construction, reconstruction, installation, relocation, or alteration of any mechanical system, except as permitted in Chapter 1, Section 111.2 of the 2013 California Mechanical Code. Projects requiring permits include, but are not limited to:

- New HVAC installation /HVAC Changeout
- Replacement of furnace, coil, FAU, or condenser and other mechanical components
- Relocation of an existing HVAC unit

2013 BUILDING ENERGY EFFICIENCY STANDARDS (Title 24, Part 6) REQUIREMENTS INCLUDE:

New space conditioning systems or components other than space conditioning ducts must meet applicable prescriptive requirements of §141. California Energy Code

Minor equipment maintenance such as replacement of filters or belts does not trigger the prescriptive requirements. Equipment replacement such as the installation of a new air handler or cooling tower would be subject to the prescriptive requirements of §141. Another example is if an existing VAV system is expanded to serve additional zones, the new VAV boxes are subject to zone controls of §140.4(g) California Energy Code.

Replacements of electric resistance space heaters for high rise residential apartments are also exempt from §141.0(b)2C, California Energy Code, requirements. Replacements of electric heat or electric resistance space heaters are allowed where natural gas is not available.

For alterations there are special rules for:

1. New or Replacement Space Conditioning Systems or Components in §141.0(b)2C, California Energy Code and
2. Altered Duct Systems in §141.0(b)2D California Energy Code
3. Altered Space – Conditioning Systems in §141.0(b)2E California Energy Code

In addition to the regular field inspections by a building inspector, verification of specific systems may be needed from a HERS Rater and testing of certain equipment by an Acceptance Test Technician may be necessary under these new regulations. Called "Acceptance Testing", these tests must be completed by an Acceptance Test Technician, HERS Rater, or Installer, as indicated by the forms. Completed Certificate of Acceptance(s) are provided by the installing contractor or Acceptance Test Technician. Effective January 1, 2015, Certificates of Acceptance and Certificates of Installation forms must be registered documents from an approved non-residential data registry.

NRCC-MCH-01-E and NRCC-MCH-02-E is required for all HVAC alterations. NRCC-MCH-03-E is required for duct, VAV and/or outdoor air alterations. NRCC-MCH-01-E is required to be provided by the installing contractor. Other forms may be provided through acceptance testing and HERS verification.

The attached Ace Resources Residential Trigger Sheet for Nonresidential Built-up HVAC Alterations and Nonresidential Small Commercial HVAC Alterations provide detailed information for requirements that apply to nonresidential HVAC alterations.



Small Commercial HVAC Alterations

Packaged Units — Single-zone, Constant Air Volume (CAV) — and Split Systems

	Mandatory Measures						Prescriptive Requirements							
	Tstat \$110.2(c) \$120.2 (a), (b), (c) & (e)	Supply & Exhaust Dampers (Ventilation provided by HVAC) \$120.2(f)	Min. Cooling Efficiency \$110.2(a)	Min. Heating Efficiency \$110.2(a)	Ventilation Calcs (NRCC- MCH-03-E) \$120.1	Demand Control Ventilation ^A \$120.1(c) 3 & 4	Duct Insulation \$120.4	Demand Shed Controls ^B \$120.2	Cooling Load Calcs \$140.4(b)	Heating Load Calcs \$140.4(b)	Equipment Sizing (per load calcs) \$140.4(a)	Fan Power ^C \$140.4(c)	Econo- mizer ^D \$140.4(e)	Duct Seal & Test ^E \$140.4(l), 140.9(b)2E
Change this (and nothing else) Whole Pkg Unit Or split system NO DUCTS	YES	YES	YES	YES	YES	YES ^A	NO	YES ^B	YES	YES	YES	YES ^C	YES ^D	YES ^E
Cooling Coil of Packaged System	YES	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES ^E
Split System, Outdoor Unit	YES	NO	YES	YES ^F	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES
Split System, Indoor Unit	YES	NO	YES	YES ^F	NO	NO	NO	NO	NO	NO	YES	NO	NO	YES
Some ducts	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	YES ^E
≥75% ducts	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	YES ^E
≥75% new ducts and Whole Pkg Unit and Split System	YES	YES	YES	YES	YES	YES ^A	YES	YES ^B	YES	YES	YES	YES ^C	YES ^D	YES ^E

NOTE: ★ For Nonresidential HVAC systems, a change in blower motor, compressor, condenser coil, or plenum is considered a repair and does not trigger the Title 24, Part 6 Standards.

- A If system is single-zone with any controls or multi-zone with direct digital control, and has airside economizer, and serves a high-density space (≥25 people per 1,000 ft²)
- B Only required if the altered unit has direct digital controls (DDC) to the zone level.
- C If total system fan power is >25 hp
- D If >54,000 Btu/h cooling capacity (4.5 tons)
- E If CAV single-zone system and serves <5,000 ft conditioned floor area and >25% duct surface in unconditioned space
- F If split system operates as a heat pump, heating efficiency must meet mandatory requirements in §110.2.

Small Commercial HVAC Alterations

Acceptance Tests: Packaged Units — Single-zone, Constant Air Volume (CAV) — and Split Systems

	2013-NRCA-MCH-02-A: Ventilation Systems	2013-NRCA-MCH-03-A: Constant-volume, Single-zone Unitary A/C and HP Temperature Scheduling & Controls for DX units	013-NRCA-MCH-04-A: Air Distribution Systems	2013-NRCA-MCH-05-A: Air Economizer Controls	2013-NRCA-MCH-06-A: Demand Control Ventilation	2013-NRCA-MCH-10-A: Demand Shed Controls
Change this (and nothing else)	Adequate OSA (when ventilation provided by HVAC)	Proper system temperature scheduling & controls for DX units	Duct leakage rate	Proper operation of economizer controls	Proper operation of DCV controls	Demand response
Whole package unit	YES	YES	YES ^A	YES ^B	YES ^C	YES ^D
Cooling coil	NO	NO	YES	NO	NO	NO
Entire Split System	YES	YES	YES	YES	YES	YES
Some ducts	NO	NO	YES ^A	NO	NO	NO
≥75% ducts	NO	NO	YES ^A	NO	NO	NO
≥75% new ducts and Whole Pkg Unit and Split System	YES ^B	YES	YES ^A	YES ^B	YES ^C	YES ^D

NOTE: + For Nonresidential HVAC systems, a change in blower motor, compressor, condenser coil, or plenum is considered a repair and does not trigger the Title 24, Part 6 Standards.

- A If ducts are for a single-zone CAV unit serving <5,000 ft, and if >25% duct surface area in unconditioned space
- B If the system has an economizer, and it is NOT factory installed and CEC certified
- C If system is single-zone with any controls or multi-zone with direct digital control, and has airside economizer, and serves a high-density space (≥25 people per 1,000 ft²)
- D The acceptance test requirement only applies if the unit has DDC controls.



TRIGGERS for 2013 Title 24, Part 6 Nonresidential Built-up HVAC Alterations

	Mandatory Measures					Prescriptive Requirements				
	Design Requirements ^A §10-103(a) ¹	Required Controls §120.2 (a), (b), & (e)	Supply & Exhaust Dampers §120.2(f)	Ventilation Calcs §120.1	Demand Control Ventilation [^] §120.1(c) 3 & 4	Duct Installation §120.4	Equipment Sizing (per load calcs) §140.4(a)(b)	Fan Power ^B §140.4(c)	Economizer ^C §140.4(e)	SAT Reset Controls §140.4(f)
Change this (and nothing else)										
Entire Unit	YES	YES	YES	YES	YES	no	YES	YES	YES	YES
Cooling Coil	YES	YES	no	no	no	no	no	no	no	no
Heating Coil, Burner	YES	YES	no	no	no	no	no	no	no	no
Blower Fan (Supply, Return/Exhaust) ^E	YES	no	no	no	no	no	no	no	no	no
Compressor ^E	YES	no	no	no	no	no	no	no	no	no
Condenser Coil ^E	YES	no	no	no	no	no	no	no	no	no
Plenums	YES	no	no	no	no	no	no	no	no	no
Duct Work	YES	no	no	no	no	YES	no	no	no	no
Dampers	YES	no	no	YES	YES	no	no	no	no	no
Sensors and Control Equipment	YES	YES	no	no	YES	no	no	YES	YES	YES

^AMust be completed by a third-party registered Professional Engineer.

^B If total system fan power is >25 hp.

^C If >\$4,000 Btu/h nominal cooling capacity (4.5 tons).

^D Should not exceed 6% of the nominal air handler airflow rate. If it is a constant-volume, single zone unit that serves <5,000 ft conditioned floor area and >25% duct surface in unconditioned space. (Typically this will not apply to built-up systems.)

^E This is considered a repair and does not trigger the Title 24, Part 6 Standards.

^F Exemption: when system heating or cooling is expanded only onto existing systems, systems and equipment do not apply to §110.0, §120.9, §140.4, §140.5.





Acceptance Tests

Non-residential Built-up HVAC Alterations

Form and Measure Matrix ^A	Setback T-stat, Zone Control	Supply & Exhaust Dampers, Isolation Devices	Min. Cooling And/or Heating Efficiency, Load Calcs	Ventilation Calcs, Economizer FDD, DCV	Demand Shedding	Duct Installation	Supply Temp Reset	Equipment Sizing	Fan Power ^B	Shutoff & Reset	Duct Seal & Test ^D	Variable Flow Control
2013-NRCA-MCH-02-A Outdoor Air	no	YES	no	YES	no	no	no	no	no	no	no	no
2013-NRCA-MCH-05-A Air Economizer Controls	no	YES	no	YES	no	no	no	no	no	no	no	no
2013-NRCA-MCH-06-A Demand Control Ventilation	no	YES	no	YES	no	no	no	no	no	no	no	no
2013-NRCA-MCH-07-A Supply Fan VFD	no	YES	no	no	no	no	no	no	YES	YES	no	YES
2013-NRCA-MCH-08-A Valve Leakage	no	YES	no	no	no	no	no	no	no	no	no	no
2013-NRCA-MCH-09-F Supply Water Temperature Reset	no	no	no	no	no	no	YES	no	no	no	no	no
2013-NRCA-MCH-10-A Hydronic System Variable Flow	YES	YES	no	no	no	no	no	no	no	YES	no	YES
2013-NRCA-MCH-11-A Automatic Demand Shed	YES	no	no	no	YES	no	no	no	no	YES	no	no
2013-NRCA-MCH-12-F Fault Detection and Diagnostic for DX Systems	no	no	no	YES	no	no	no	no	no	no	no	no
2013-NRCA-MCH-13-F Fault Detection and Diagnostic for AHUs	no	no	no	YES	no	no	no	no	no	no	no	no



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Form and Measure Matrix A	Setback T-stat, Zone Control	Supply & Exhaust Dampers, Isolation Devices	Min. Cooling And/or Heating Efficiency, Load Calcs	Ventilation Gales, Economizer FDD, DCV	Demand Shedding	Duct Installation	Supply Temp Reset	Equipment Sizing	Fan Power ^B	Shutoff & Reset	Duct Seal & Test ^D	Variable Flow Control
2013-NRCA-MCH-16-F Supply Air Temp Reset	YES	no	no	no	no	no	YES	no	no	no	no	no
2013-NRCA-MCH-17-F Condenser Water Temperature Reset	no	no	no	no	no	no	YES	No	no	no	no	YES
2013-NRCA-MCH-18-F Energy Management Control System	YES	YES	YES	YES	YES	no	YES	YES	YES	YES	YES	YES



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DOCUMENT DATE 20140221

CERTIFICATE OF COMPLIANCE	NRCC-MCH-01-E
Mechanical Systems	(Page 1 of 3)
Project Name:	Date Prepared:

MECHANICAL COMPLIANCE FORMS & WORKSHEETS (check box if worksheet is included)

*For detailed instructions on the use of this and all Energy Efficiency Standards compliance forms, refer to the 2013 Nonresidential Manual
 Note: The Enforcement Agency may require all forms to be incorporated onto the building plans.*

YES	NO	Form/Worksheet #	Title
<input type="checkbox"/>	<input type="checkbox"/>	NRCC-MCH-01-E (Part 1 of 3)	Certificate of Compliance, Declaration. Required on plans for all submittals.
<input type="checkbox"/>	<input type="checkbox"/>	NRCC-MCH-01-E (Part 2 of 3)	Certificate of Compliance, Required Acceptance Tests (MCH-02A to 11A). Required on plans for all submittals.
<input type="checkbox"/>	<input type="checkbox"/>	NRCC-MCH-01-E (Part 3 of 3)	Certificate of Compliance, Required Acceptance Tests (MCH-12A to 18A). Required on plans where applicable.
<input type="checkbox"/>	<input type="checkbox"/>	NRCC-MCH-02-E (Part 1 of 2)	Mechanical Dry Equipment Summary is required for all submittals with Central Air Systems. It is optional on plans.
<input type="checkbox"/>	<input type="checkbox"/>	NRCC-MCH-02-E (Part 2 of 2)	Mechanical Wet Equipment Summary is required for all submittals with chilled water, hot water or condenser water systems. It is optional on plans.
<input type="checkbox"/>	<input type="checkbox"/>	NRCC-MCH-03-E	Mechanical Ventilation and Reheat is required for all submittals with multiple zone heating and cooling systems. It is optional on plans.

MECHANICAL HVAC ACCEPTANCE FORMS (check box for required forms)

Designer:
This form is to be used by the designer and attached to the plans. Listed below are all the acceptance tests for HVAC systems. The designer is required to check the applicable boxes for all acceptance tests that apply and list all equipment that requires an acceptance test. All equipment of the same type that requires a test, list the equipment description and the number of systems.

Installing Contractor:
 The contractor who installed the equipment is responsible to either conduct the acceptance test them self or have a qualified entity run the test for them. If more than one person has responsibility for the acceptance testing, each person shall sign and submit the Certificate of Acceptance applicable to the portion of the construction or installation for which they are responsible.

Enforcement Agency:
*Plancheck – The NRCC-MCH-01-E form is not considered a completed form and is not to be accepted by the building department unless the correct boxes are checked.
 Inspector - Before occupancy permit is granted all newly installed process systems must be tested to ensure proper operations.*

Test Description		MCH-02A	MCH-03A	MCH-04A	MCH-05A	MCH-06A	MCH-07A	MCH-08A	MCH-09A	MCH-10A	MCH-11A
Equipment Requiring Testing or Verification	# of units	Outdoor Air	Single Zone Unitary	Air Distribution Ducts	Economizer Controls	Demand Control Ventilation (DCV)	Supply Fan VAV	Valve Leakage Test	Supply Water Temp. Reset	Hydronic System Variable Flow Control	Automatic Demand Shed Control
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

CERTIFICATE OF COMPLIANCE	NRCC-MCH-01-E
Mechanical Systems	(Page 2 of 3)
Project Name:	Date Prepared:

MECHANICAL HVAC ACCEPTANCE FORMS (check box for required forms)

Designer:
This form is to be used by the designer and attached to the plans. Listed below are all the acceptance tests for HVAC systems. The designer is required to check the applicable boxes for all acceptance tests that apply and list all equipment that requires an acceptance test. All equipment of the same type that requires a test, list the equipment description and the number of systems.

Installing Contractor:
 The contractor who installed the equipment is responsible to either conduct the acceptance test them self or have a qualified entity run the test for them. If more than one person has responsibility for the acceptance testing, each person shall sign and submit the Certificate of Acceptance applicable to the portion of the construction or installation for which they are responsible. The following tests require a

Enforcement Agency:
Plancheck – The NRCC-MCH-01-E form is not considered a completed form and is not to be accepted by the building department unless the correct boxes are checked.
Inspector - Before occupancy permit is granted all newly installed process systems must be tested to ensure proper operations.

Test Description		MCH-12A	MCH-13A	MCH-14A	MCH-15A	MCH-16A	MCH-17A	MCH-18A
Equipment Requiring Testing or Verification	# of units	Fault Detection & Diagnostics for DX Units	Automatic Fault Detection & Diagnostics for Air & Zone	Distributed Energy Storage DX AC Systems	Thermal Energy Storage (TES) Systems	Supply Air Temperature Reset Controls	Condenser Water Reset Controls	ECMS
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

CERTIFICATE OF COMPLIANCE		NRCC-MCH-01-E
Mechanical Systems		(Page 3 of 3)
Project Name:	Date Prepared:	

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

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

Documentation Author Name:	Documentation Author Signature:
Company:	Signature Date:
Address:	CEA/ HERS Certification Identification (if applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

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

1. The information provided on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer).
3. The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name:	Responsible Designer Signature:
Company :	Date Signed:
Address:	License:
City/State/Zip:	Phone:



CERTIFICATE OF COMPLIANCE		NRCC-MCH-02-E
HVAC Dry System Requirements		(Page 1 of 3)
Project Name:	Date Prepared:	

Equipment Tags and System Description ¹				
MANDATORY MEASURES	T-24 Sections	Reference to the Requirements in the Contract Documents²		
Heating Equipment Efficiency ³	110.1 or 110.2(a)			
Cooling Equipment Efficiency ³	110.1 or 110.2(a)			
HVAC or Heat Pump Thermostats	110.2(b), 110.2(c)			
Furnace Standby Loss Control	110.2(d)			
Low leakage AHUs	110.2(f)			
Ventilation ⁴	120.1(b)			
Demand Control Ventilation ⁵	120.1(c)4			
Occupant Sensor Ventilation Control ⁶	120.1(c)5, 120.2(e)3			
Shutoff and Reset Controls ⁷	120.2(e)			
Outdoor Air and Exhaust Damper Control	120.2(f)			
Isolation Zones	120.2(g)			
Automatic Demand Shed Controls	120.2(h)			
Economizer FDD	120.2(i)			
Duct Insulation	120.4			
PRESCRIPTIVE MEASURES				
Equipment is sized in conformance with 140.4 (a & b)	140.4(a & b)	Y/N	Y/N	Y/N
Supply Fan Pressure Control	140.4(c)			
Simultaneous Heat/Cool ⁸	140.4(d)			
Economizer	140.4(e)			
Heat and Cool Air Supply Reset	140.4(f)			
Electric Resistance Heating ⁹	140.4(g)			
Duct Leakage Sealing and Testing. ¹⁰	140.4(l)			
Notes:				
<ol style="list-style-type: none"> Provide equipment tags (e.g. AHU 1 to 10) and system description (e.g. Single Duct VAV reheat) as appropriate. Multiple units with common requirements can be grouped together. Provide references to plans (i.e. Drawing Sheet Numbers) and/or specifications (including Section name/number and relevant paragraphs) where each requirement is specified. Enter "N/A" if the requirement is not applicable to this system. The referenced plans and specifications must include all of the following information: equipment tag, equipment nominal capacity, Title 24 minimum efficiency requirements, and actual rated equipment efficiencies. Where multiple efficiency requirements are applicable (e.g. full- and part-load) include all. Where appliance standards apply (110.1), identify where equipment is required to be listed per Title 20 1601 et seq. Identify where the ventilation requirements are documented for each central HVAC system. Include references to both central unit schedules and sequences of operation. If one or more space is naturally ventilated identify where this is documented in the plans and specifications. Multiple zone central air systems must also provide a MCH-03-E form. If one or more space has demand controlled ventilation identify where it is specified including the sensor specifications and the sequence of operation. If one or more space has occupant sensor ventilation control identify where it is specified including the sensor specifications and the sequence of operation If the system is DDC identify the sequences for the system start/stop, optimal start, setback (if required) and setup (if required). For all systems identify the specification for the thermostats and time clocks (if applicable). Identify where the heating, cooling and deadband airflows are scheduled for this system. Include a reference to the specification of the zone controls. Provide a MCH-03-E form. Enter N/A if there is no electric heating. If the system has electric heating indicate which exception to 140.4(g) applies. If duct leakage sealing and testing is required, a MCH-04-A form must be submitted. 				

HVAC WET SYSTEM REQUIREMENTS

CEC-NRCC-MCH-02-E (Revised 06/13)

CALIFORNIA ENERGY COMMISSION



CERTIFICATE OF COMPLIANCE		NRCC-MCH-02-E
HVAC Wet System Requirements		(Page 2 of 3)
Project Name:	Date Prepared:	

Equipment Tags and System Description ¹	T-24 Sections	Reference to the Requirements in the Contract Documents ²		
MANDATORY MEASURES				
Heating Hot Water Equipment Efficiency ³	110.1			
Cooling Chilled and Condenser Water Equipment Efficiency ³	110.1, 140.4(i)			
Open and Closed Circuit Cooling Towers conductivity or flow-based controls	110.2(e) 1			
Open and Closed Circuit Cooling Towers Maximum Achievable Cycles of Concentration (LSI) ⁶	110.2(e) 2			
Open and Closed Circuit Cooling Towers Flow Meter with analog output	110.2(e) 3			
Open and Closed Circuit Cooling Towers Overflow Alarm	110.2(e) 4			
Open and Closed Circuit Cooling Towers Efficient Drift Eliminators	110.2(e) 5			
Pipe Insulation	120.3			
PRESCRIPTIVE MEASURES				
Cooling Tower Fan Controls	140.4(h)2, 140.4(h)5	Y/N	Y/N	Y/N
Cooling Tower Flow Controls	140.4(h)3			
Centrifugal Fan Cooling Towers ⁴	140.4(h)4			
Air-Cooled Chiller Limitation ⁵	140.4(j)			
Variable Flow System Design	140.4(k)			
Chiller and Boiler Isolation	140.4(k)			
CHW and HHW Reset Controls	140.4(k)			
WLHP Isolation Valves	140.4(k)			
VSD on CHW, CW & WLHP Pumps >5HP	140.4(k)			
DP Sensor Location	140.4(k)			
Notes:				
<ol style="list-style-type: none"> 1. Provide equipment tags (e.g. CH 1 to 3) or system description (e.g. CHW loop) as appropriate. Multiple units with common requirements can be grouped together. 2. Provide references to plans (i.e. Drawing Sheet Numbers) and/or specifications (including Section name/number and relevant paragraphs) where each requirement is specified. Enter "N/A" if the requirement is not applicable to this system. 3. The referenced plans and specifications must include all of the following information: equipment tag, equipment nominal capacity, Title 24 minimum efficiency requirements, and actual rated equipment efficiencies. Where multiple efficiency requirements are applicable (e.g. full- and part-load) include all. For chillers operating at non-standard efficiencies provide the Kadj values. For chillers also note whether the efficiencies are Path A or Path B. 4. Identify if cooling towers have propeller fans. If towers use centrifugal fans document which exception is used. 5. If air-cooled chillers are used, document which exceptions have been used to comply with 140.4(j) and the total installed design capacity of the air-cooled chillers in the chilled water plant. 6. Identify the existence of a completed MCH-06-E \when open or closed circuit cooling towers are specified to be installed, otherwise enter "N/A". 				

HVAC SYSTEM REQUIREMENTS

CEC-NRCC-MCH-02-E (Revised 06/13)

CALIFORNIA ENERGY COMMISSION



CERTIFICATE OF COMPLIANCE		NRCC-MCH-02-E
HVAC Wet System Requirements		(Page 3 of 3)
Project Name:	Date Prepared:	

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT	
1. I certify that this Certificate of Compliance documentation is accurate and complete.	
Documentation Author Name:	Documentation Author Signature:
Company:	Signature Date:
Address:	CEA/ HERS Certification Identification (if applicable):
City/State/Zip:	Phone:
RESPONSIBLE PERSON'S DECLARATION STATEMENT	
I certify the following under penalty of perjury, under the laws of the State of California:	
<ol style="list-style-type: none"> The information provided on this Certificate of Compliance is true and correct. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer). The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application. I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy. 	
Responsible Designer Name:	Responsible Designer Signature:
Company :	Date Signed:
Address:	License:
City/State/Zip:	Phone:

CERTIFICATE OF COMPLIANCE	NRCC-MCH-03-E
Mechanical Ventilation & Reheat	
Project Name:	Date Prepared:

ACTUAL DESIGN INFO (FROM EQUIPMENT SCHEDULES, ETC)				AREA BASIS			OCCUPANCY BASIS			MINIMUM		VAV Reheated Primary Air CFM		VAV Deadband Primary Air CFM					
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
ZONE / SYSTEM / VAV BOX TAG	DESIGN PRIMARY COOLING AIRFLOW (CFM)	DESIGN PRIMARY DEAD-BAND AIRFLOW (CFM)	DESIGN PRIMARY HEATING AIRFLOW (CFM)	CNTRL TYPE DDC (Y/N)	TRANSFER AIRFLOW (CFM)	CONDITIONED AREA (ft ²)	MIN CFM PER AREA	MIN CFM BY AREA	NUM. OF PEOPLE	CFM PER PERSON	MIN CFM BY OCCU-PANT	REQ'D VENT AIRFLOW (MAX OF I OR L) (CFM)	COMPLIES	PRIMARY COOLING AIR (50% DDC, 30% NON-DDC) (CFM)	MAXIMUM REHEAT CFM (MAX OF M OR O)	COMPLIES?	(20% DDC, N/A NON-DDC) (CFM)	(larger of M or R, N/A for NON-DDC) (CFM)	COMPLIES

- Yellow shaded cells require user input. Remaining cells are protected and automatic
- B. The largest amount of primary air supplied by the terminal unit when it's operating in the cooling mode.
 - C. The smallest amount of primary air supplied by the terminal unit in the deadband mode.
 - D. The largest amount of primary air supplied by the terminal unit when it's operating in the heating mode.
 - E. A terminal unit can be controlled with DDC controls, or non-DDC controls. Each control category has different reheat limitations in code.
 - F. Transfer Air must be provided where Required Ventilation Airflow (Column M) is greater than the Design Primary Deadband Airflow (Column C).
 - H. Minimum ventilation rate per Section §120.1. Table 120.1-A.
 - J. Based on number of fixed seats where applicable or the greater of the expected number of occupants and 50% of the CBC occupant load for egress purposes for spaces without fixed seating.
 - M. Required Ventilation Airflow (Req'd Ventilation Airflow) is the larger of the ventilation rates calculated on an AREA BASIS or OCCUPANCY BASIS (Column I or L)
 - N. This column identifies whether or not the Design Primary Deadband Airflow complies or not. It compares the value in column M to the value in column C and column F.
 - O. Design Primary Cooling Airflow * 0.50 for DDC, Design Primary Cooling Airflow * 0.30 for Non-DDC. If the Design Primary Cooling Airflow is less than 300 cfm, then this is not applicable.
 - P. Maximum of Column M and Column O. If the Design Primary Cooling Airflow is 300 cfm or less, then this is not applicable.
 - Q. This column identifies whether or not the Design Primary Reheat Airflow at the zone level, complies or not. It compares the value in column P to the value in column D.
 - R. Design Primary Cooling Airflow * 0.20 for DDC. Not applicable for Non-DDC zones or zones where Design Primary Cooling Airflow is is 300 cfm or less.
 - S. Maximum of Column M and Column R. Not applicable if the Design Primary Cooling Airflow is 300 cfm or less.
 - T. This column identifies whether or not the Design Primary Deadband Airflow at the zone level, complies or not. It compares the value in column S to the value in column C.

MECHANICAL VENTILATION AND REHEAT

CEC-NRCC-MCH-03-E (Revised 06/14)



CERTIFICATE OF COMPLIANCE		NRCC-MCH-03-E
Mechanical Ventilation & Reheat		(Page 2 of 2)
Project Name:	Date Prepared:	

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT	
1. I certify that this Certificate of Compliance documentation is accurate and complete.	
Documentation Author Name:	Documentation Author Signature:
Company:	Signature Date:
Address:	CEA/ HERS Certification Identification (if applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT	
I certify the following under penalty of perjury, under the laws of the State of California:	
<ol style="list-style-type: none"> 1. The information provided on this Certificate of Compliance is true and correct. 2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer). 3. The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations. 4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application. 5. I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy. 	
Responsible Designer Name:	Responsible Designer Signature:
Company :	Date Signed:
Address:	License:
City/State/Zip:	Phone:



CERTIFICATE OF INSTALLATION		NRCI-MCH-01-E
Mechanical		(Page 1 of 2)
Project Name:	Enforcement Agency:	Permit Number:
Project Address:	City:	Zip Code:

A. GENERAL INFORMATION	
DATE OF BUILDING PERMIT	
BUILDING TYPE	
PHASE OF CONSTRUCTION	
<i>If more than one person has responsibility for building construction, each person shall prepare and sign an Installation Certificate document applicable to the portion of construction for which they are responsible; alternatively, the person with chief responsibility for construction shall prepare and sign the Installation Certificate document(s) for the entire construction.</i>	

B. SCOPE OF RESPONSIBILITY		
Date of approval by the enforcement agency of the Certificate of Compliance that provides the specifications for this Installation Certificate.		
<i>In the table below identify all applicable construction documents that specify the features, materials, components, manufactured devices, or system performance diagnostic results required for the scope of responsibility for this Installation Certificate.</i>		
Document Title or Description	Applicable Sheets or Pages, Tables, Schedules, etc.	Date Approved By the Enforcement Agency



CERTIFICATE OF INSTALLATION		NRCI-MCH-01-E
Mechanical		(Page 2 of 2)
Project Name:	Enforcement Agency:	Permit Number:
Project Address:	City:	Zip Code:

Document Title or Description	Applicable Sheets or Pages, Tables, Schedules, etc.	Date Approved By the Enforcement Agency

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT		
1. I certify that this Certificate of Installation documentation is accurate and complete.		
Documentation Author Name:	Documentation Author Signature:	
Documentation Author Company Name:	Date Signed:	
Address:	CEA/ HERS Certification Identification (If applicable):	
City/State/Zip:	Phone:	
RESPONSIBLE PERSON'S DECLARATION STATEMENT		
I certify the following under penalty of perjury, under the laws of the State of California:		
<ol style="list-style-type: none"> The information provided on this Certificate of Installation is true and correct. I am eligible under Division 3 of the Business and Professions Code in the applicable classification to accept responsibility for the system design, construction, or installation of features, materials, components, or manufactured devices for the scope of work identified on this Certificate of Installation and attest to the declarations in this statement (responsible builder/installer), otherwise I am an authorized representative of the responsible builder/installer. The constructed or installed features, materials, components or manufactured devices (the installation) identified on this Certificate of Installation conforms to all applicable codes and regulations, and the installation conforms to the requirements given on the plans and specifications approved by the enforcement agency. I reviewed a copy of the Certificate of Compliance approved by the enforcement agency that identifies the specific requirements for the scope of construction or installation identified on this Certificate of Installation, and I have ensured that the requirements that apply to the construction or installation have been met. I will ensure that a completed signed copy of this Certificate of Installation shall be posted, or made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Installation is required to be included with the documentation the builder provides to the building owner at occupancy. 		
Responsible Builder/Installer Name:	Responsible Builder/Installer Signature:	
Company Name: (Installing Subcontractor or General Contractor or Builder/Owner)	Position With Company (Title):	
Address:	CSLB License:	
City/State/Zip:	Phone	Date Signed: