B

2013 BUILDING ENERGY EFFICIENCY STANDARDS – NONRESIDENTIAL HVAC ALTERATIONS

CITY OF STOCKTON

COMMUNITY DEVELOPMENT DEPARTMENT—345 N. EL DORADO STREET—STOCKTON, CA 95202—(209) 937-8561

www.stocktongov.com/CDD/building

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 §141.0 of the 2013 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 §141.0. 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.

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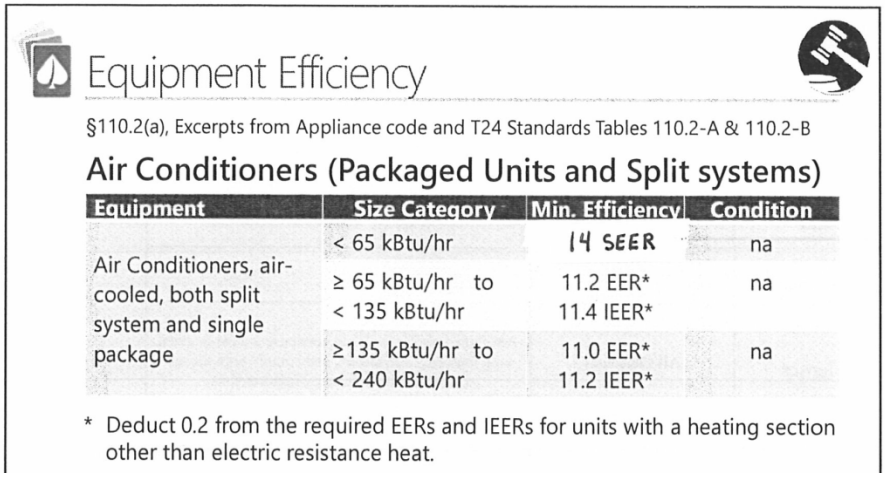
WHAT FORMS ARE REQUIRED?

NRCC-MCH-01-E and **NRCC-MCH-02-E** are required for all HVAC alterations. **NRCC-MCH-03-E** is required for duct, VAV and/or outdoor air alterations. **NRCI-MCH-01-E** is required to be provided by the installing contractor at time of inspection. Other forms may be required through acceptance testing and HERS verification as indicated on the completed NRCC-MCH-01-E form.

MINIMUM EQUIPMENT EFFICIENCY FOR COMMON SYSTEMS INDICATED BELOW



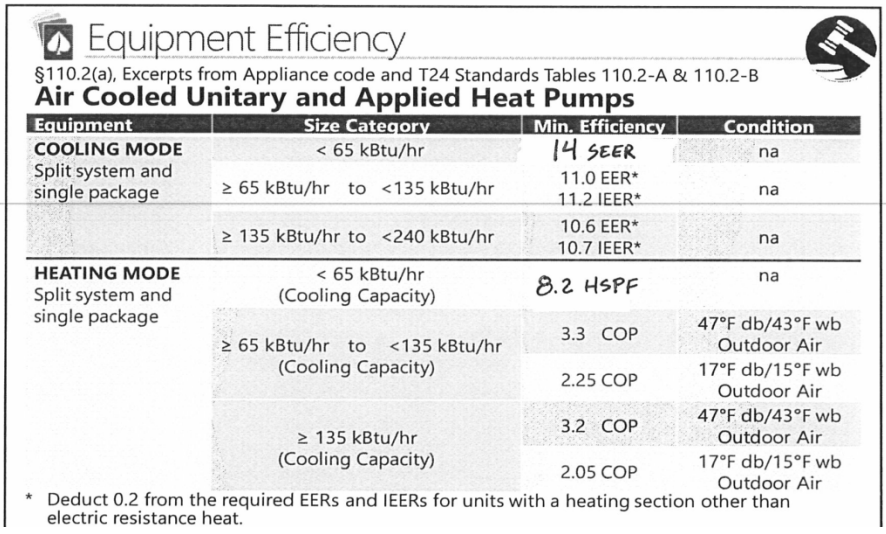
Equipment Efficiency

§110.2(a), Excerpts from Appliance code and T24 Standards Tables 110.2-A & 110.2-B

Air Conditioners (Packaged Units and Split systems)

Equipment	Size Category	Min. Efficiency	Condition
Air Conditioners, air-cooled, both split system and single package	< 65 kBtu/hr	14 SEER	na
	≥ 65 kBtu/hr to < 135 kBtu/hr	11.2 EER* 11.4 IEER*	na
	≥135 kBtu/hr to < 240 kBtu/hr	11.0 EER* 11.2 IEER*	na

* Deduct 0.2 from the required EERs and IEERs for units with a heating section other than electric resistance heat.



Equipment Efficiency

§110.2(a), Excerpts from Appliance code and T24 Standards Tables 110.2-A & 110.2-B

Air Cooled Unitary and Applied Heat Pumps

Equipment	Size Category	Min. Efficiency	Condition
COOLING MODE Split system and single package	< 65 kBtu/hr	14 SEER	na
	≥ 65 kBtu/hr to <135 kBtu/hr	11.0 EER* 11.2 IEER*	na
	≥ 135 kBtu/hr to <240 kBtu/hr	10.6 EER* 10.7 IEER*	na
HEATING MODE Split system and single package	< 65 kBtu/hr (Cooling Capacity)	8.2 HSPF	na
	≥ 65 kBtu/hr to <135 kBtu/hr (Cooling Capacity)	3.3 COP	47°F db/43°F wb Outdoor Air
		2.25 COP	17°F db/15°F wb Outdoor Air
	≥ 135 kBtu/hr (Cooling Capacity)	3.2 COP	47°F db/43°F wb Outdoor Air
		2.05 COP	17°F db/15°F wb Outdoor Air

* Deduct 0.2 from the required EERs and IEERs for units with a heating section other than electric resistance heat.

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.

Ace Resources | Title 24 Part 6 Nonresidential Triggers Sheet

Small Commercial HVAC Alterations

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

Change this (and nothing else)	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
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	NO	**YES**	NO	**YES**
Ductwork[G]	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 ft^2)

[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 including under a roof that does not meet current prescriptive insulation requirements.

[F] If split system operates as a heat pump, heating efficiency must meet mandatory requirements in §110.2.

[G] Check with your local building department to see if changes to duct work only will require a permit.

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Ace Resources | Title 24 Part 6 Nonresidential Triggers Sheet

Small Commercial HVAC Alterations

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

Change this (and nothing else)	2013-NRCA-MCH-02-A: Ventilation Systems Adequate OSA (when ventilation provided by HVAC)	2013-NRCA-MCH-03-A: Constant-volume, Single-zone Unitary A/C and HP Temperature Scheduling & Controls for DX units Proper system temperature scheduling & controls for DX units	013-NRCA-MCH-04-H: Air Distribution Systems Duct leakage rate	2013-NRCA-MCH-05-A: Air Economizer Controls Proper operation of economizer controls	2013-NRCA-MCH-06-A: Demand Control Ventilation Proper operation of DCV controls	2013-NRCA-MCH-11-A: Demand Shed 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**
Ductwork[E]	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 ft^2)

[D] The acceptance test requirement only applies if the unit has DDC controls.

[E] Check with your local building department to see if changes to duct work only will require a permit.

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TRIGGERS for 2013 Title 24, Part 6

Nonresidential

Built-up HVAC Alterations

Change this (and nothing else)	Mandatory Measures					Prescriptive Requirements			
	Required Controls §120.2 (a), (b), & (e)	**Supply & Exhaust Dampers** §120.2(f)	**Ventilation Calcs** §120.1	**Demand Control Ventilation**[A] §120.1(c) 3 & 4	**Duct Insulation** §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)
Entire Unit	**YES**	**YES**	**YES**	**YES**	no	**YES**	**YES**	**YES**[G]	**YES**
Cooling Coil	**YES**	no	no	no	no	no	no	no	no
Heating Coil, Burner	**YES**	no	no	no	no	no	no	no	no
Blower Fan (Supply, Return / Exhaust) [E]	no	no	no	no	no	no	no	no	no
Compressor [E]	no	no	no	no	no	no	no	no	no
Condenser Coil [E]	no	no	no	no	no	no	no	no	no
Plenums	no	no	no	no	no	no	no	no	no
Duct Work	no	no	no	no	**YES**	no	no	no	no
Dampers	no	no	**YES**	**YES**	no	no	no	no	no
Sensors and Control Equipment	no	no	no	no	no	no	no	no	**YES**
Economizers	no	no	no	no	no	no	no	**YES**	no

[A] If required

[B] If total system fan power is >25 hp.

[C] If >54,000 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.

[G] Exceptions may apply

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TRIGGERS for 2013 Title 24, Part 6
Nonresidential New HVAC Simple Systems

Space Conditioning Equipment [A]	Mandatory Measures							Prescriptive Requirements			
	Zone Thermostat [B] §120.2(a), (b) Setback Capable [L]	**DCV** [C] §120.1(c)	**Shutoff and Reset** [D] §120.2(e)	**Ventilation Dampers** [E] §120.2(f) Automatic close upon fan shutdown [M]	**Isolation Devices** [F] §120.2(g)	**Demand Shedding** [G] §120.2(h)	**Economizer FDD** [H] §120.2(i) §140.4(e)	**Zone Control** [I] §140.4(d)	**Supply Temperature Reset** [U] §140.4(f)	**Economizer** [E, W] §140.4(e)1, 2, 3, 4, 5	**Variable Flow Control** [K] §140.4(k)6 §140.4(m)
Package Terminal Air Conditioner [S, T]	**YES** [N]	**YES**	**YES** [V]	**YES**	no	**YES**	**YES**	**YES**	**YES**	**NA**	**YES** [J]
Unitary Air Conditioners and Condensing Units [N]	**YES**	**YES**	**YES** [V]	**YES**	no	no	**YES**	no	no	**YES**	no
Unitary Heat Pumps [Q]	**YES**	**YES**	**YES** [V]	**YES**	no	no	**YES**	no	no	**YES**	no
Applied Heat Pumps [Q]	**YES**	**YES**	**YES** [V]	**YES**	**YES**	**YES**	**YES**	**YES**	no	**YES**	**YES** [J]
Forced Air Furnace	**YES**	**YES**	**YES** [V]	**YES** [R]	no	**YES**	**YES**	no	no	**YES**	no
Unit Heater	**YES**	no	**YES** [V]	no	no	no	no	no	no	no	no

[A] Central Energy Management Control System (EMCS) should be installed at building site for optimal equipment operation and coordination.
[B] Feedback received from zones through EMCS. Load required based on number of satisfied zones.
[C] Demand Control Ventilation. See §120.1(c) 3, 4, &5 for additional CO_2 concentration setpoint information and sensor location requirements.
[D] Must include automatic restart to maintain setback temperatures as necessary.
[E] Only applies to new air-cooled unitary direct-expansion systems with 54,000 Btu/h capacity or greater. See §120.2(i) for greater detail.
[F] For systems serving multiple zones totaling more than 25,000 sq. ft..
[G] Include settings capable of disabling, manually controlling, or automatically operating equipment.
[H] Fault detection and diagnostics (FDD) systems are commonly available for packaged HVAC units, and can be integrated directly by the manufacturer. These are required for all systems with cooling capacity of 54 kBtu/h (4 ½ tons) or greater. Controls include economizer checks and refrigerant diagnostics. The systems can report failures or suboptimal conditions that impact efficiency. Required acceptance tests for these systems may be found Reference Appendix NA7, 7.5.11."
[I] Simultaneous heat and cool prevention except for variable-air-volume and other system types listed in this section. Ambient conditions also provide lockout for seasonal operation only.
[J] Variable Frequency Drive necessary to operate supply fan speed control at the unit.
[K] Air-side applications referred to in respective code language. Central EMCS necessary for remote system operation and ability to oversee all space-conditioning equipment and pumping needs.

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[L] Heating and Cooling Setpoint dead band of ± 5°F should be implemented on all temperature setpoints. Applies only to equipment with heating AND cooling capability. Setback zone temperature setpoint to 55°F or lower for heating and 85°F or higher for cooling.
[M] Exemptions for; gravity dampers, combustion air paths, 24 hour operation, or local law jurisdiction.
[N] Stand-alone single room window units are exempt (See §110.2(c)).
[O] Damper to reduce ventilation to zero during unoccupied periods.
[P] Assuming system has ventilation capacity at the terminal device.
[Q] Air or water source configuration.
[R] Reference to combustion air requirements.
[S] Configurations vary between availability of central plant in design or reliance on self-contained heating and cooling.
[T] Special application requirements for Hotels, High-rise Residential, and Perimeter Zoning. Setback capable terminal devices should be used except where zone is not on EMCS. In that case, capability of four programmable control periods per 24 hours is required (§110.2(c)).
[U] A reset strategy defined and applied to the supply air stream of the unit or terminal device.
[V] Must include automatic time switch OR occ. sensor OR 4-hour timer. 7-day programmable local control exemption.
[W] Exemptions apply where: (1) outside air conditions are undesirable, (2) high-rise residential, (3) adverse effects of other systems, like dehumidification, (4) high cooling efficiency systems [Table 140.1-A] (5) computer rooms served per §140.9(a).
[X] When systems system includes cooling.

Acceptance Tests

These Forms Trigger These Forms	2013-NRCA-MCH-02-A Ventilation Systems	2013-NRCA-MCH-03-A Constant Volume, Single-zone, Unitary A/C and HP	2013-NRCA-MCH-05-A Air Economizer Controls	2013-NRCA-MCH-06-A Demand Control Ventilation	2013-NRCA-MCH-07-A Supply Fan VFD	2013-NRCA-MCH-08-A Valve Leakage	2013-NRCA-MCH-11-A Automatic Demand Shed	2013-NRCA-MCH-12-F Fault Detection and Diagnostic for DX Systems	2013-NRCA-MCH-13-F Fault Detection and Diagnostic for AHUs	2013-NRCA-MCH-16-F Supply Air Temp Reset	2013-NRCA-MCH-18-F Energy Management Control System
Zone T-Stats	no	**YES**	no	no	no	no	no	no	no	**YES**	**YES**
DCV	**YES**	**YES**	**YES**	**YES**	**YES**	no	no	no	no	**YES**	**YES**
Shutoff and Reset	no	**YES**	no	no	no	no	**YES**	no	no	**YES**	**YES**
Ventilation Dampers	**YES**	**YES**	**YES**	no	**YES**	no	no	no	no	**YES**	**YES**
Isolation Devices	no	**YES**	no	no	no	**YES**	no	no	no	**YES**	**YES**
Demand Shedding	no	**YES**	no	no	no	no	**YES**	no	no	**YES**	**YES**
Econ. FDD	**YES**	**YES**	**YES**	no	**YES**	no	no	**YES**	**YES**	**YES**	**YES**
Zone Control	no	**YES**	no	no	no	no	**YES**	no	no	**YES**	**YES**
Supply Temp. Reset	no	no	no	no	no	no	no	no	**YES**	**YES**	**YES**
Variable Flow Control	no	no	no	no	**YES**	no	no	no	no	**YES**	**YES**

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TRIGGERS for 2013 Title 24, Part 6
Nonresidential New HVAC Complex Systems

Space Conditioning Equipment [A]	Mandatory Measures							Prescriptive Requirements			
	Zone Thermostat [B] §120.2(a), (b) Setback Capable [L]	DCV [C] §120.1(c)	Shutoff and Reset [D] §120.2(e)	Ventilation Dampers [E] §120.2(f) Automatic close upon fan shutdown [M]	Isolation Devices [F] §120.2(g)	Demand Shedding [G] §120.2(h)	Economizer FDD [H] §120.2(i) §140.4(e)	Zone Control [I] §140.4(d)	Supply Temperature Reset §140.4(f)	Economizer [E, Q] §140.4(e)1, 2, 3, 4, 5	Variable Flow Control [K] §140.4(k)6 §140.4(m)
Boiler	no	no	**YES**	**YES** [N]	**YES**	**YES**	no	**YES**	**YES** [J]	**NA**	**YES**
Air-cooled Chiller	no	no	**YES**	**YES** [O]	**YES**	**YES**	no	**YES**	**YES** [P]	**NA**	**YES**
Water-cooled Chiller	no	no	**YES**	**YES** [O]	**YES**	**YES**	no	**YES**	**YES** [P]	**NA**	**YES**
Variable Refrigerant Flow (VRF) [P]	**YES**	**YES**	**YES** [V]	**YES** [O]	**YES**	**YES**	**YES**	**YES**	no	**YES**	**YES**

[A] Central Energy Management Control System (EMCS) should be installed at building site for optimal equipment operation and coordination.
[B] Feedback received from zones through EMCS. Load required based on number of satisfied zones.
[C] Demand Control Ventilation. See §120.1(c) 3, 4, & 5 for additional CO2 concentration set point information and sensor location requirements.
[D] Must include automatic restart to maintain setback temperatures as necessary.
[E] Only applies to new air-cooled unitary direct-expansion systems with 54,000 Btu/h capacity or greater. See §120.2(i) for greater detail.
[F] For systems serving multiple zones totaling more than 25,000 sq. ft.
[G] Include settings capable of disabling, manually controlling, or automatically operating equipment.
[H] Fault detection and diagnostics (FDD) systems are commonly available for packaged HVAC units, and can be integrated directly by the manufacturer. These are required for all systems with cooling capacity of 54 kBtu/h (4 ½ tons) or greater. Controls include economizer checks and refrigerant diagnostics. The systems can report failures or suboptimal conditions that impact efficiency. Required acceptance tests for these systems may be found Reference Appendix NA7, 7.5.11." Simultaneous heat and cool prevention except for variable-air-volume and other system types listed in this section. Ambient conditions also provide lockout for seasonal operation only.
[I] Simultaneous heat and cool prevention except for variable-air-volume and other system types listed in this section. Ambient conditions also provide lockout for seasonal operation only.
[J] Referred to as "Hot Water Supply Temperature Reset".
[K] Includes reference to both water and air-side applications referred to in respective code language. Central EMCS necessary for remote system operation and ability to oversee all space-conditioning equipment and pumping needs.
[L] Heating and cooling set point dead band of ±5°F should be implemented on all temperature set points. Applies only to equipment with heating AND cooling capability. Setback zone temperature set point to 55°F or lower for heating and 85°F or higher for cooling.
[M] Exemptions for: gravity dampers, combustion air paths, 24 hour operation, or local law jurisdiction.
[N] Reference to combustion air requirements.

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[O] Reference to mechanical room ventilation fan where chillers are located.
[P] Referred to as “Chilled Water Supply Temperature Reset”.
[Q] Exemptions apply where: (1) outside air conditions are undesirable, (2) high-rise residential, (3) adverse effects of other systems, like dehumidification, (4) high cooling efficiency systems [Table 140.1-A] (5) computer rooms served per §140.9(a).

Acceptance Tests

These forms trigger these acceptance tests	2013-NRCA-MCH-07-A Supply Fan VFD	2013-NRCA-MCH-08-A Valve Leakage	2013-NRCA-MCH-09-F Supply Water Temperature Reset	2013-NRCA-MCH-10-A Hydronic System Variable Flow	2013-NRCA-MCH-11-A Automatic Demand Shed	2013-NRCA-MCH-17-F Condenser Water Temperature Reset	2013-NRCA-MCH-18-F Energy Management Control System
Zone T-Stats	no	no	no	no	no	no	**YES**
DCV	**YES**	no	no	no	no	no	**YES**
Shutoff and Reset	no	no	no	**YES**	**YES**	no	**YES**
Ventilation Dampers	**YES**	no	no	no	no	no	**YES**
Isolation Devices	no	**YES**	no	**YES**	no	no	**YES**
Demand Shedding	no	no	no	no	**YES**	no	**YES**
Econ. FDD	**YES**	no	no	no	no	no	**YES**
Zone Control	no	no	no	**YES**	**YES**	no	**YES**
Supply Temp. Reset	no	no	**YES**	no	no	**YES**	**YES**
Variable Flow Control	**YES**	no	no	no	no	no	**YES**