



NOT REGISTERED - CAN BE USED FOR SUBMISSION TO BUILDING DEPARTMENTS PRIOR TO DECEMBER 31, 2023

### Project Details

<u>Field Name</u>	<u>Data Entry</u>	<u>Field Name</u>	<u>Data Entry</u>
<u>Project Name:</u>		<u>Enforcement Agency:</u>	
<u>Dwelling Address:</u>		<u>Permit Number:</u>	
<u>City and Zip Code:</u>		<u>Date Permit Issued:</u>	

### Table A. Project Information

Complete one Certificate of Compliance LMCC-MCH-01-E for each building on the project site.

<b>Field</b>	<b>Field Name</b>	<b>Data Entry</b>
01	Project Location (city)	
02	Climate Zone (1-16)	
03	Occupancy Type within Project (See Note 1)	<div> <input type="radio"/> Office           <input type="radio"/> Warehouse           <input type="radio"/> School           <input type="radio"/> Low-Rise Residential           <input type="radio"/> Healthcare Facility           <input type="radio"/> Theater           <input type="radio"/> Auditorium           <input type="radio"/> Relocatable School Building           <input type="radio"/> Data Center           <input type="radio"/> Classroom           <input type="radio"/> Grocery Store           <input type="radio"/> Restaurant/Commercial Kitchen           <input type="radio"/> All Others         </div> <div> <input type="radio"/> Retail           <input type="radio"/> Hotel/Motel           <input type="radio"/> Support Areas           <input type="radio"/> Commercial           <input type="radio"/> Parking Garage           <input type="radio"/> Sports Arena           <input type="radio"/> Library           <input type="radio"/> Medical Clinic           <input type="radio"/> Convention Center           <input type="radio"/> Gymnasium           <input type="radio"/> Religious Facility           <input type="radio"/> Financial Institution         </div>
04	Total Conditioned Floor Area (square feet)	
05	Total Unconditioned Floor Area (square feet)	
06	Number of Stories (Habitable above grade)	



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## B. Project Scope

Table Instructions: Include any mechanical systems that are within the scope of the permit application and are demonstrating compliance using the mandatory requirements in §110.2, §120.1, §120.2, §120.4, §120.5, §120.9 and prescriptive path outlined in §140.4, or §141.0(b)2 for alterations.

This table includes mechanical systems or components that are within the scope of the permit application and are demonstrating compliance using the mandatory requirements in sections 110.2, 120.1, 120.2, 120.4, 120.5, 120.9 and prescriptive path outlined in sections 140.4, 170.2(b) or section 141.0(b)2 and 180.2(b)2 for alterations. Note that healthcare facilities must be ventilated in accordance with Chapter 4 of the CMC as amended by OSHPD and do not need to show compliance with Title 24, Part 6 ventilation requirements in Section J. Check all elements that apply.

**ALERT! Healthcare facilities must be ventilated in accordance with Chapter 4 of the CMC as amended by OSHPD and do not need to show compliance with Title 24, Part 6 ventilation requirements in Table J.**

**Table B: Project Scope**

Check all that apply.

Field	Field Name	Data Entry
01	Air System(s)	<input type="checkbox"/> Heating Air System <input type="checkbox"/> Cooling Air System
	Mechanical Controls	<input type="checkbox"/> Mechanical Controls (existing to remain, altered or new)
02	Water System Components	<input type="checkbox"/> Water Economizer <input type="checkbox"/> Pumps <input type="checkbox"/> System Piping <input type="checkbox"/> Cooling Towers <input type="checkbox"/> Chillers <input type="checkbox"/> Boilers
03	Dry System Components	<input type="checkbox"/> Air Economizer <input type="checkbox"/> Electric Resistance Heat <input type="checkbox"/> Fan Systems <input type="checkbox"/> Ductwork (existing to remain, altered or new) <input type="checkbox"/> Ventilation <input type="checkbox"/> Zonal Systems/ Terminal Boxes



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### C. COMPLIANCE RESULTS

Indicate the compliance status for each component as specified in table C. The options are limited to "COMPLIES," "DOES NOT COMPLY," "COMPLIES with Exceptional Conditions" (referring to Table D), "N/A". An entry must be made for each row in Table C.

**Table C: Compliance Results**

Field	Field Name	Energy Code Sections	Section Table	Compliance Status
01	System Summary	110.1, 110.2, 140.4, 170.2(c)	F	
02	Pumps	140.4(k), 170.2(c)4I	G	
03	Fans Economizers	140.4(c), 140.4(e), 170.2(c)	H	
04	System Controls	110.2, 120.2, 140.4(f), 170.2(c)	I	
05	Ventilation	120.1, 160.2	J	
06	Terminal Box Controls	140.4(d), 170.2(c)4B	K	
07	Distribution	120.3, 120.4, 160.2, 160.3	L	
08	Cooling Towers	110.2(e)2	M	

### D. EXCEPTIONAL CONDITIONS

For all entries in Table C that are marked as: "COMPLIES WITH EXCEPTION" a corresponding entry must be included in Table D.

**Table D: Exceptional Conditions**

☐ Check here if additional tables are attached.



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### E. ADDITIONAL REMARKS

Enter any additional remarks made by the permit applicant to the authority having jurisdiction in Table E.

**Table E: Additional Remarks**

☐ Check here if additional tables are attached.

### F. HVAC SYSTEMS SUMMARY (DRY AND WET SYSTEMS)

This section is used to document the mechanical equipment compliance with the Energy Code sections 110.1, 110.2, 140.4(a), 140.4(b), 140.4(k) (or 141.0(b)2), 170.2(c)1, 170.2(c)3, and 180.2(b)2 as they are applicable to the project (Table B).

**Table F-1: HVAC System Summary**

☐ Check here if additional tables are attached.

Field	Field Name	HVAC-1	HVAC-2	HVAC-3
01	Names/Tag			
02	Quantity			
03	System Serving (See Note 1)			
04	System Status (See Note 2)			
05	Space Type (See Note 3)			
06	Utilizing Recovered Heat (See Note 4)			
07	Distribution System Type			

**NOTES:**

1. If System Serving is set to Multi-Zone or Multi-Dwelling, then select "N/A" for System Status, Space Type, and Utilizing Recovery Heat.



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2. If System Status is set to "Alteration," then select "N/A" for Space Type, Utilizing Recovered Heat, and Distribution System Type.
3. Space Type is limited to "Retail," "Grocery," "School," "Financial Institution," "Library," "Office Space in Warehouse," "Office," "Other," or "N/A."
4. If System Status is set to "Other," then select "N/A" for Utilizing Recovered Heat.

**Table F-2: Dry System Equipment Sizing**

Table F-2 is completed for air conditioners, condensers, heat pumps, VRF, furnaces, unit heaters and DOAS systems

☐ Check here if additional tables are attached.

Field	Field Name	Energy Code Section	HVAC-1	HVAC-2	HVAC-3
01	System Name/Tag (Table F-1)	N/A			
02	Equipment Category	Tables 110.2, 140.4(a)2 and 170.2(c)3a			
03	Equipment Type	Tables 110.2 and Title 20			
04	Smallest Size	140.4(a), 170.2(c)1, For NA-Altered: 141.0(b)2E and 180.2(b)2			
05-11	Equipment Size per Mechanical Schedule(kBtu/Hour)	140.4 (a), 140.4(b), 170.2(c)1, and 170.2(c)2	Applies to 05 through 11	Applies to 05 through 11	Applies to 05 through 11
05	Heating Output Per Design	See Above			
06	Heating Output Rated	See Above			
07	Heating Output Supplemental	See Above			
08	Cool Output Sensible per Design	See Above			
09	Cooling Output Rated	See Above			



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Field	Field Name	Energy Code Section	HVAC-1	HVAC-2	HVAC-3
10	Load Calculations Total Heating Load	140.4(b) and 170.2(c)2			
11	Load Calculations Total Sensible Cooling Load	140.4(b) and 170.2(c)2			

## Notes:

1. Equipment must be the smallest size, within the available options of the desired equipment line, necessary to meet the design heating and cooling loads of the building per section 140.4(a) and section 170.2(c)1. Healthcare facilities are excepted.
2. It is common practice to show rated output capacity on the equipment schedule. Sensible cooling output comes from specification sheet tables.
3. If equipment is heating only, leave cooling output and load blank. If equipment is cooling only, leave heating output and load blank.

**Table F-3: Dry System Equipment Efficiency**

Table F-3 is completed for all HVAC systems other than package terminal air conditioners (PTAC), package terminal heat pumps (PTHP), DX-DOAS and Dual Fuel Heat Pumps

☐ Check here if additional tables are attached.

Field	Field Name	Energy Code Section	HVAC-1	HVAC-2	HVAC-3
01	System Name/Tag	N/A			
02	Size Category (Btu/h)	N/A			
03	Heating Mode Rating Condition (°F)	N/A			
04	Heating Mode Efficiency Unit	N/A			
05	Heating Mode Min. Eff. Required	Tables 110.2 and Title 20			
06	Heating Mode Design Efficiency	N/A			
07	Cooling Mode Efficiency Unit	N/A			
08	Cooling Mode Min. Eff. Required	Tables 110.2 and Title 20			
09	Cooling Mode Design Efficiency	N/A			



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**Table F-4: Dry System Equipment Efficiency**

Table F-4 is completed for all HVAC systems other than package terminal air conditioners (PTAC), package terminal heat pumps (PTHP), DX-DOAS and heat pumps.

☐ Check here if additional tables are attached.

Field	Field Name	Energy Code Section	HVAC-1	HVAC-2	HVAC-3
01	System Name/Tag	N/A			
02	Size Category (Btu/h)	N/A			
03	Heating Mode Rating Condition (°F)	N/A			
04	Heating Mode Minimum Efficiency Required	Tables 110.2 and Title 20 (See Note 1)			
05	Heating Mode Design Efficiency	N/A			
06	Cooling Mode Minimum Efficiency Required	Tables 110.2 and Title 20 (See Note 2)			
07	Cooling Mode Design Efficiency	N/A			

Note:

- Using Tables 110.2-A through N, look up and record all Heating Mode Minimum Efficiency Required values (or results of calculation shown in the table), including the efficiency units.
  - Heating mode efficiency Units are limited to COP, AFUE, Et, Ec, and HSPF.
- Using Tables 110.2-A through N, look up and record all Cooling Mode Minimum Efficiency Required values (or result of calculations shown in the table), including the efficiency units.
  - Cooling mode efficiency units are limited to EER, IEER, SEER, COP, and SCOP.



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**Table F-5: Dry System Equipment Efficiency**

Table F-5 is completed for package terminal air conditioners (PTAC) and package terminal heat pumps (PTHP) only.

☐ Check here if additional tables are attached.

Field	Field Name	Energy Code Section	HVAC-1	HVAC-2	HVAC-3
01	System Name/Tag	N/A			
02	Heating Mode Rated Output Capacity (kBtu/h)	N/A			
03	Heating Mode Minimum COP Required	Table 110.2-E			
04	Heating Mode Design COP	N/A			
05	Cooling Mode Rated Output Capacity (kBtu/h)	N/A			
06	Cooling Mode Minimum EER Required	Table 110.2-E			
07	Cooling Mode Design EER	N/A			

**Table F-6: Boiler Efficiency and Controls**

☐ Check here if additional tables are attached.

Record the Following:

1. Identify the service load of the boiler system:
2. Minimum System Efficiency for High-Capacity Boilers Required per Section 140.4(k)8A:
3. Designed System Efficiency:

Field	Field Name	Energy Code Section	Boiler-1	Boiler-2	Boiler-3
01	Boiler Name/Tag	N/A			
02	Equipment Type	(See Note 2)			
03	Quantity	N/A			
04	Rated Input Capacity (Btu/h)	(See Note 3)			
05	Rated Efficiency	N/A			
06	Minimum Efficiency Required	110.2			
07	Efficiency Unit	N/A			
08	Boiler Controls Isolation Valve	140.4(k) and 170.2(c)liii	<input type="checkbox"/> Yes <input type="checkbox"/> NA-1 boiler	<input type="checkbox"/> Yes <input type="checkbox"/> NA-1 boiler	<input type="checkbox"/> Yes <input type="checkbox"/> NA-1 boiler





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Field	Field Name	Energy Code Section	Boiler-1	Boiler-2	Boiler-3
09	Boiler Controls Temperature Reset	140.4(k) and 170.2(c)liii (See Note 4)			
10	High-Capacity Boiler Exceptions	(See Note 5)			

## Notes:

1. All of the following must be true:
  - a. 25% of annual space heating is provided by on site renewable energy, site recovered energy, or heat recovery chillers
  - b. 50% or more of the design heating load is served using perimeter convective heating, and/or radiant panels
  - c. Installed In Multifamily Building Boiler system added to an existing building
2. Equipment Type: use NRCC-PLB to document compliance with domestic hot water and service water heating systems. Limited to the following entries:
  - a. Hot water – Gas Fired
  - b. Hot Water – Oil Fired
  - c. Steam – Gas Fired (NOT natural draft)
  - d. Steam – Gas Fired (natural draft)
  - e. Steam - Oil Fired
3. Rated Input Capacity: Maximum capacity-maximum ratings per the certified unit capacity and includes oil-fired (residual).
4. Boiler Controls Temperature Reset is limited to “Yes,” “NA <500 kBtu/h,” “NA-Variable Flow Controls,” or “NA-Healthcare.”
5. High Capacity Boiler Exception is limited to the following:
  - a. >=25% space heating provided by on-site renewable
  - b. >=25% space heating provided by site recovered energy
  - c. >=25% space heating provided heat recovery chillers
  - d. Installed in individual dwelling unit
  - e. >=50% heating served by perimeter convective/radiant ceiling panels
  - f. Serving Multifamily Occupancy
  - g. No Exceptions Apply

**Table F-7: Chiller Efficiency and Controls**☐ Check here if additional tables are attached.

Field	Field Name	Energy Code Section	Chiller-1	Chiller-2	Chiller-3
01	Name/Tag	N/A			
02	Equipment Type	(See Note 3)			
03	Quantity	N/A			
04	Size Category1 (Tons)	(See Note 4)			



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Field	Field Name	Energy Code Section	Chiller-1	Chiller-2	Chiller-3
05	Chiller Efficiency "Path B" Exception	140.4(i) and 170.2(c)g (See Note 5)			
06	Rated Efficiencies	N/A			
07	Efficiencies Required	110.2			
08	Efficiency Unit	N/A			
09	Controls Isolation Valve	140.4(k) and 170.2(c)l (See Note 6)			
10	Controls Temperature Reset	140.4(k) and 170.2(c)l (See Note 7)			

## Notes:

- Chilled water plants cannot have more than 300 tons provided by air-cooled chillers, but exceptions may apply per section 140.4(j).
- Efficiency required is a minimum when "EER" or "COP" is the Efficiency Unit in row 08. It is also a minimum when "IPLV" is the unit for air-cooled, absorption, and water-cooled gas engine chillers. Efficiency required is a maximum when "kW/ton" is the Efficiency Unit and when "IPLV" is the unit for water cooled electrically operated chillers.
- Equipment Type is limited to the following:
  - Air Cooled: Condenser elec. operated
  - Air Cooled: w/o condenser elec. operated
  - Water Cooled: Reciprocating
  - Water Cooled: Positive displacement
  - Water Cooled: Centrifugal
  - Air Cooled: Absorption, single effect
  - Water Cooled: Absorption, single effect
  - Absorption: Double effect, indirect fired
  - Absorption: Double effect, direct fired
  - Water Cooled: Gas engine
- Size Category is limited to the following:
  - < 75
  - ≥ 75 and < 150
  - ≥ 150 and < 300
  - ≥ 300 and < 400
  - ≥ 400 and < 600
  - ≥ 600
- Chiller Efficiency "Path B" Exception is limited to the following:
  - No exception taken
  1. Electrical service > 600V
  2. Heat recovery w/ design capacity > 40% of the design chiller cooling capacity
  3. Charging energy storage systems w/ charging temperature < 40°F



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- e. 4. 4th (or more) chiller in this building
- 6. Control – Isolation Valve is limited to the following:
  - a. Yes
  - b. NA: only 1 chiller in plant
  - c. NA: chillers in series
- 7. Control – Temperature Reset is limited to the following:
  - a. Yes
  - b. NA:  $\leq 500$  kBtu/hr (41.67 tons)
  - c. NA: Variable Flow Controls
  - d. NA: System serves Healthcare

**Table F-8: Dedicated Outdoor Air System (DOAS)**

Table F-8 is for DOAS systems only; for DX-DOAS use Table F-9.

☐ Check here if additional tables are attached.

Field	Field Name	Energy Code Section	DOAS-1	DOAS-2	DOAS-3
01	Name/Tag	N/A			
02	Quantity	N/A			
03	Delivered directly to the space	N/A			
04	DOAS Fan Control	N/A			
05	Multi-Zone DOAS with Cooling	140.4(p)4 and 170.2(c)4N			
06	Multifamily DOAS	N/A			

**Table F-9: Direct Exchange - Dedicated Outdoor Air System (DX-DOAS)**

☐ Check here if additional tables are attached.

Field	Field Name	Energy Code Section	DX-DOAS-1	DX-DOAS-2	DX-DOAS-3
01	Name/Tag	N/A			
02	Equipment Type	Table 110.2-K (See Note 1)			
03	Quantity	N/A			
04	Energy Recovery	N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
05	Rating Condition	N/A (See Note 2)			
06	Rated Efficiencies	N/A			
07	Minimum Efficiency Required	Table 110.2-K (See Note 3)			

Notes:



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1. Equipment Type is limited to the following:
  - a. Air Cooled
  - b. Air Source Heat Pump
  - c. Water Cooled
  - d. Water Source Heat Pump
2. Rating Condition is limited to the following based on Equipment Type Entry:
  - a. If Equipment Type is set to Air Cooled or Air Source Heat Pump, then enter N/A
  - b. If Equipment Type is set to Water Cooled, then enter one of the following:
    - i. Cooling Tower Condenser Water
    - ii. Chilled Water
  - c. If Equipment Type is set to Water Source Heat Pump, then enter one of the following:
    - i. Ground Source Closed Loop
    - ii. Ground Water Source
    - iii. Water Source
3. Using Table 110.2-K, lookup and record the Minimum Efficiency Required, including the units.
  - a. DX-DOAS Units, Single-Package and Remote Condenser – Minimum Efficiency units are limited to either ISMRE or IS COP.

**Table F-10: Dual Fuel Heat Pump (DFHP)**

Complete Table F-10 for each dual fuel heat pump in the project scope.

☐ Check here if additional tables are attached.

Field	Field Name	Energy Code Section	Heat Pump	Dual-Fuel
01	Name/Tag	N/A		N/A
02	Equipment Category	N/A	<input type="checkbox"/> Unitary Heat Pump <input type="checkbox"/> Unitary Heat Pump with no electric resistance	<input type="checkbox"/> Furnace <input type="checkbox"/> Unit Heater
03	Equipment Type	Tables 110.2-B, C, E, H, N (See Note 1)		
04	Size Category (Btu/h)	Tables 110.2-B, C, E, H, N (See Note 2)		
05	Heating Mode Rating Condition (°F)	Tables 110.2-B, C, E, H, N (See Note 3)		N/A
06	Heating Mode Minimum Efficiency Required	Tables 110.2-B, C, E, H, N (See Note 4)		
08	Heating Mode Design Efficiency	N/A		



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Field	Field Name	Energy Code Section	Heat Pump	Dual-Fuel
10	Cooling Mode Minimum Efficiency Required	Tables 110.2-B, C, E, H, N (See Note 5)		
11	Cooling Mode Design Efficiency	N/A		

Notes:

1. Equipment Type is limited as follows:
  - a. For heat pumps, it is limited to the entries made in Tables 110.2-B, -C, -E, -H, and -N.
  - b. For the dual fuel, it is limited to the entries made in Table 110.2-I.
2. Size Category is limited as follows:
  - a. For heat pumps, it is limited to the entries made in Tables 110.2-B, -C, -E, -H, and -N.
  - b. For the dual fuel, it is limited to the entries made in Table 110.2-I.
  - c. In some instances, the units in Table 110.2 are given in tons. In these instances, convert tons to Btu/hr. (multiply tons by 12,000 to get Btu/hr.).
3. Heating Mode Rating condition is limited to the entries made in Tables 110.2-B, -C, -E, -H, and -N.
4. Heating Mode Minimum Efficiency Required is completed as follows:
  - a. For Heat Pumps: Using Tables 110.2-B, -C, -E, -H, and -N, look up and record all Heating Mode Minimum Efficiency Required values (or results of calculation shown in the table), including the efficiency units.
  - b. For Dual Fuel: Using Table 110.2-I, look up and record all Heating Mode Minimum Efficiency Required values (or results of calculation shown in the table), including the efficiency units.
5. Cooling Mode Minimum Efficiency Required is completed as follows:
  - a. For Heat Pumps: Using Tables 110.2-B, -C, -E, -H, and -N, look up and record all Cooling Mode Minimum Efficiency Required values (or results of calculation shown in the table), including the efficiency units.
  - b. For Dual Fuel: Using Table 110.2-I, look up and record all Cooling Mode Minimum Efficiency Required values (or results of calculation shown in the table), including the efficiency units.



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**Table F-11: Heat Rejection Equipment (HRE)**

This table includes the efficiency and controls for cooling towers, condensers, and waterside Economizers.

☐ Check here if additional tables are attached.

Field	Field Name	Energy Code Section	HRE-1	HRE-2	HRE-3
01	Name/Tag	N/A			
02	Equipment Type	Table 110.2-F (See Note 2)			
03	Quantity	N/A			
04	Rating Condition (°F)	N/A (See Note 3)			
05	Rated Performance	N/A			
06	Minimum Required Performance	Table 110.2-F, 140.4(h)5 and 170.2(c)fv			
07	Performance Unit	N/A			
08	Fan Speed Control	140.4(h)1 (See Note 4)			
09	Tower Flow Turndown	140.4(h)2 (See Note 5)			
10	Fan Control in Multiple Cell Equipment	140.4(h)4 (See Note 6)			
11	Economizer Controls	140.4(e) (See Note 7)			
12	Condenser Water Temp Reset Controls	N/A			

**Notes:**

- Centrifugal fan open-circuit towers are not allowed for rated capacities > 900 gpm at 95°F condenser water return, 85°F condenser water supply and 75°F outdoor wet-bulb temperature. Exceptions may apply per Section 140.4(h)4.
- Equipment Type is limited to the following:
  - Axial fan open-circuit tower, CW loop in CHW plant  $\geq$  900gpm
  - Replacement axial fan open-circuit tower, CW loop in CHW plant  $\geq$  900gpm
  - Propeller/axial fan open-circuit cooling tower
  - Propeller/axial fan closed-circuit cooling tower
  - Centrifugal fan open-circuit cooling tower
  - Centrifugal fan closed-circuit cooling tower
  - Propeller/axial fan evaporative condensers
  - Centrifugal fan evaporative condensers
  - Air cooled condensers
  - Waterside Economizer
  - Propeller/axial fan dry cooler
- Rating Condition is limited to the following:



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- a. 165°F entering gas temp
  - b. 105°F condensing temp
  - c. 75°F entering air wet bulb
  - d. 140°F entering gas temp
  - e. 96.3°F condensing temp
  - f. 75°F entering air wet bulb
4. Fan Speed Control is limited to the following:
  - a. Yes
  - b. NA - Fan motor < 7.5hp (5.6kW)
  - c. NA - Integral to other equipment
  - d. NA - Conditioning fans serving greater than one refrigerant circuits
  - e. NA - Conditioning fans serving flooded condition
  - f. NA - Multiple fans and lead fans meet requirements
5. Tower Flow Turndown is limited to the following:
  - a. Yes
  - b. NA - Single condenser water pump
  - c. NA - Not open-circuit tower
6. Fan Control in Multiple Cell Equipment is limited to the following:
  - a. Yes
  - b. NA - Not multiple cell
  - c. NA - No variable speed drives
7. Economizer Controls is intended for waterside economizers only and is thus limited to the following:
  - a. Designed per Section 140.4(e)
  - b. NA - Equipment Type is not Waterside Economizer

**Table F-12: Electric Resistance Heating**

☐ Check here if additional tables are attached.

Field	Field Name	Energy Code Section	ERH-1	ERH-2	ERH-3
01	Name/Tag	N/A			
02	Equipment Description	(See Note 1)			
03	Output Capacity (kW)	N/A			
04	Applicable exception to allowing electric resistance heating	140.4(g) (See Note 2)			

Notes:

1. Equipment Description is limited to the following:
  - a. Baseboard
  - b. Under-mat
  - c. Other
2. Applicable Exception is limited to the following:



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- a. Exception 1: Supplement to a heating system in which at least 60% of the annual energy requirement is supplied by site-solar or recovered energy.
- b. Exception 2: Supplement to a heat pump heating system and the heating capacity of the heat pump is more than 75% of the design heating load calculated in accordance with section 140.4.
- c. Exception 3: Total capacity of electric-resistance heating systems serving the entire building is less than 10% of the total design output capacity of all heating equipment serving the entire building.
- d. Exception 4: Total capacity of electric-resistance heating systems serving the entire building, excluding those allowed under Exception 2, is no more than 3 kW.
- e. Exception 5: Serving an entire building that is not high-rise residential or hotel/motel and has a conditioned floor area no greater than 5,000 ft<sup>2</sup>, has no mechanical cooling and is in an area without natural gas access.
- f. NA - Alteration, replacement of existing electric resistance heating system.

### G: Pumps

Table G is used to demonstrate compliance with prescriptive hydronic system requirements found in Sections 140.4(k) and 170.2(c)4I applicable to pumps less than 5 horsepower.

**Table G: Pumps**

☐ Check here if additional tables are attached.

Field	Field Name	Energy Code Section	Pump-1	Pump-2	Pump-3
01	Name/Tag	N/A			
02	Equipment Type	(See Note 1)			
03	Quantity	N/A			
04	Horsepower	N/A			
05	Controls Variable Flow	140.4(k) and 170.2(c)4I (See Note 2)			
06	Controls Hydronic Heat Pump Isolation	140.4(k) and 170.2(c)4I (See Note 3)			
07	Controls VSD on Pumps > 5hp	140.4(k) and 170.2(c)4I (See Note 4)			
08	Controls Differential Pressure Sensor	140.4(k) and 170.2(c)4I (See Note 5)	<input type="checkbox"/> Required <input type="checkbox"/> N/A	<input type="checkbox"/> Required <input type="checkbox"/> N/A	<input type="checkbox"/> Required <input type="checkbox"/> N/A

#### Notes:

1. Equipment Types is limited to the following:
  - a. Primary chilled water
  - b. Secondary chilled water
  - c. Primary heating hot water
  - d. Secondary heating hot water
  - e. Tertiary heating hot water





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- f. Condenser water
2. Controls – Variable Flow is limited to the following:
  - a. Yes
  - b. NA: < 3 control valves
  - c. NA: pump system < 1.5 hp
  - d. NA - Equipment Type is Condenser Water
3. Controls Hydronic Heat Pump Isolation is only used for Equipment Type of Condenser Water and is limited to the following:
  - a. Yes
  - b. NA: Not connected to common water loop
  - c. NA: No hydronic heat pump
4. Controls – VSD on Pumps > 5hp is limited to the following:
  - a. Yes
  - b. NA: Not serving variable flow system
  - c. NA: Condenser water serving only water-cooled chillers
  - d. NA - less than or equal to 5 hp
  - e. NA - Equipment Type is primary or secondary heating hot water
5. If Controls – VSD on Pumps > 5hp is set to “Yes”, set Controls - Differential Pressure Sensor to “Required,” else set to N/A.

## H. Fan Systems and Air Economizers

Section H is used to demonstrate compliance with prescriptive requirements found in Section 140.4(c), 140.4(e), 140.4(m), 170.2(c)3, and 170.2(c)4A for fan/economizer systems. Fan systems serving only process loads are exempt from these requirements and do not need to be included in Section H. Complete Table H-1 for each fan system and air economizer. First document the system details, then add fans within that system to document compliance with fan power requirements. Fan systems only process loads, are exempt from these requirements and do not need to be included in Table H. Complete Table H-2 for all fan components of the system identified in Table H-1. For fan systems that are Serving Individual OR Serving Multiple Dwelling Units (Table H-1, Field 05), Enter N/A for all entries in Table H-2.

### Table H-1: Fan Systems and Air Economizers – System Level Information

For each fan system (including economizer systems) complete Table H-1 to identify the general system features.

Field	Field Name	Energy Code Section	Data Entry
01	Name/Tag	N/A	
02	Quantity	N/A	
03	Status	N/A	<input type="checkbox"/> New <input type="checkbox"/> Altered
04	Zoning	N/A	<input type="checkbox"/> DOAS <1.0 kW <input type="checkbox"/> Multizone VAV systems <input type="checkbox"/> All other systems
05	Serving Dwelling Units	N/A	<input type="checkbox"/> Serving Individual Dwelling Unit <input type="checkbox"/> Serving Multiple Dwelling Unit <input type="checkbox"/> Not Serving Dwelling Units



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Field	Field Name	Energy Code Section	Data Entry
06	Fan Airflow	N/A	
07	Site Elevation	N/A	
08	Economizer	(See Note 1)	
09	Forced Air Flow	N/A	<input type="checkbox"/> Gas Furnace Air Handling Units <input type="checkbox"/> All Other Air Handling Units <input type="checkbox"/> Not Central Forced AHU
10	System Airflow (cfm)	N/A	
11	Design Power (kW)	N/A	
12	Design Watts/CFM	170.2(c)3biii (See Note 2)	
13	Maximum Watts/CFM	170.2(c)3biii	
14	ERV/HRV	170.2(c)3biv	<input type="checkbox"/> ERV Provided <input type="checkbox"/> HRV Provided <input type="checkbox"/> NA: CZ 3-10 <input type="checkbox"/> NA: Continuously operating supply and/or exhaust
15	Design Sensible Recovery/Effectiveness	N/A	
16	Required Sensible Recovery/Effectiveness	170.2(c)3Bivb3 (See Note 3)	<input type="checkbox"/> Yes <input type="checkbox"/> N/A
17	Recovery Bypass or Directly Economizer Controlled	170.2(c)3Bivb4 Table 170.2-G (See Note 4)	<input type="checkbox"/> Recovery Bypass <input type="checkbox"/> Direct Economizer Controls <input type="checkbox"/> N/A
18	Operation (hours/year)	N/A	<input type="checkbox"/> $\geq 8,000$ <input type="checkbox"/> $< 8,000$
19	Design Supply Airflow Rate	N/A	
20	Outdoor Airflow	N/A	
21	Percent Outdoor Air at Full Design Airflow	(See Note 5)	
22	Exemptions to Exhaust Air Heat Recovery Requirement	140.4(q) and 170.2(c)4O	<input type="checkbox"/> No Exemptions Apply <input type="checkbox"/> NA: Process system serving laboratory and/or factory exhaust <input type="checkbox"/> NA: Serving space not cooled and heated to $< 60^{\circ}\text{F}$ <input type="checkbox"/> NA: $> 60\%$ outdoor air heating energy provided by site recovered energy in CZ 16 <input type="checkbox"/> NA: Total airflow exhausted and relieved within 20ft $< 75\%$ <input type="checkbox"/> NA: Operating $< 20$ hours/week



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Field	Field Name	Energy Code Section	Data Entry
23	Exhaust Air Heat Recovery	140.4(q) and 170.2(c)4O (See Note 6)	<input type="checkbox"/> Required for both heating and cooling design conditions <input type="checkbox"/> N/A
24	Type Of Heat Recovery Rating	N/A	<input type="checkbox"/> Sensible Energy Recovery Ratio <input type="checkbox"/> Enthalpy Recovery Ratio
25	Required Recovery Ratio	(See Note 7)	<input type="checkbox"/> 60% <input type="checkbox"/> 50%
26	Energy Recovery Bypass	140.4(q)2	<input type="checkbox"/> Energy Recovery Bypass or similar control Installed <input type="checkbox"/> NA: DOAS unit with shut-off capabilities
27	Delivered Directly To The Space	140.4(p)2/170.2(c)4N 140.4(p)2/170.2(c)4N	<input type="checkbox"/> Yes <input type="checkbox"/> NA: Active Chilled Beam System Exception <input type="checkbox"/> NA: Exception
28	DOAS Fan Control	N/A	<input type="checkbox"/> >=3 speeds
29	Multi-Zone DOAS with Cooling	140.4(p)4 and 170.2(c)4N	<input type="checkbox"/> No heating or heat recovery to warm supply air > 60F when majority of zones require cooling <input type="checkbox"/> NA: No Mechanical cooling and heating <input type="checkbox"/> NA: Single Zone
30	Multi-Family DOAS	170.2(c)Ni	<input type="checkbox"/> Not Serving Multifamily Common Use Space <input type="checkbox"/> Option 1 - 170.2(c)Nia <input type="checkbox"/> Option 3 - 170.2(c)Nib <input type="checkbox"/> Option 3 - 170.2(c)Nic
31	Fan Energy Index Exception	110.2 or 110.1	<input type="checkbox"/> None Applies <input type="checkbox"/> Embedded Fan (110.2 or 110.1) <input type="checkbox"/> Computer Room Air Conditioners <input type="checkbox"/> DX-DOAS Unit <input type="checkbox"/> Embedded Fan < 5HP or < 4.1 kW <input type="checkbox"/> Circulating Fan, Ceiling Fan, or Air Curtain <input type="checkbox"/> Operates Only During Emergencies
32	Fan Energy Index	N/A	

## Notes:

## 1. Economizer is limited to the following:

- Fixed Temperature
- Fixed Enthalpy
- Differential Temperature
- Differential Enthalpy
- Waterside Economizer (See Section F)



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- f. NA - < 33 kBtu/h cooling
  - g. NA - Special OA filtration
  - h. NA - Multifamily/hotel/motel
  - i. NA - Efficiency per Table 140.4-D
  - j. NA - System operates at 100% OSA
  - k. NA - DOAS with EAHR
  - l. See NRCC-PRC for details
  - m. NA - Altered other than packaged AC or HP < 54kBty/h
  - n. NA - Controlled Environment Horticulture
2. Design Watts/CFM is calculated by dividing the Design Power by 1,000 and dividing that result by System Air Flow.
  3. If ERV/HRV is set to "Provided", then set Required Sensible Recovery/Effectiveness to "67 %," otherwise set it to "N/A."
  4. Recovery Bypass or Directly Economizer Controlled; only select Directly Economizer Controls if it is controlled by ventilation air based on outdoor air temperature limits consistent with Table 170.2-G. Select N/A if the project is not located in Climate Zones 1, 2, and 11-16, and is not using a single ventilation system to serve multiple dwelling units in a building with four or more habitable stories.
  5. Percent Outdoor Air at Full Design Airflow is calculated by dividing Design Supply Airflow Rate by Outdoor Airflow.
  6. Exhaust Air Heat Recovery. Use Table 140.4-H or 140.4-I to determine if Exhaust Air Heat Recovery is required. If Exemptions to Exhaust Air Heat Recovery is set to "No Exemptions Apply" then if Exhaust Air Heat Recovery is required, enter "Required for both heating and cooling design conditions." If exempted or not required, enter "N/A."
  7. Required Recovery Ratio. If Type of Heat Recovery Rating is set to "Sensible" the enter "60 percent," otherwise enter "50 percent."



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### Table H-2: Fan System and Air Economizer

Complete Table H-2 for each fan system that is NOT serving dwelling units.

☐ Check here if additional tables are attached.

Field	Field Name	Fan Comp 1	Fan Comp 2	Fan Comp 3	Fan Comp 4
01	Fan Name/Tag				
02	Fan Type				
03	Quantity				
04	Component				
05	Airflow Through Component (%)				
06	Water Gauge (w.g)				
07	Component Allowance				
08	Fan Allowance (watt/cfm) <sup>3</sup>				
09	Design Electrical Input Power Method				
10	Design Motor Nameplate Horsepower				
11	Design Electrical Input Power (kW)				

Notes:

1. Fans serving spaces with design background noise goals below NC35
2. Low-turndown single-zone VAV fan system must be capable of and configured to reduce airflow to 50 percent of design airflow and use no more than 30 percent of the design wattage at that airflow. No more than 10 percent of the design load served by the equipment shall have fixed loads.
3. Fan system allowance includes fan system base allowance
4. Filter pressure loss can only be counted once per fan system
5. Complex Fan System means a fan system that combines a single cabinet fan system with other supply fans, exhaust fans, or both



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## I. SYSTEM CONTROLS

Table I is used to demonstrate compliance with mandatory controls in sections 110.2 and 120.2 and prescriptive controls in sections 140.4(f) and (n) or requirements in sections 141.0(b)2E, 140.4(n), 170.2(c)4D, and 170.2(c)4L or requirements in Section §141.0(b)2E and §180.2(b)2 for altered space conditioning systems.

**Table I: System Controls**

Field	Field Name	Energy Code Section	Data Entry
01	Name/Tag	N/A	
02	System Zoning	N/A	<input type="checkbox"/> Single zone <input type="checkbox"/> Multi-zone <input type="checkbox"/> Multi-zone w/ DDC to zone
03	Conditioned Floor Area Being Served (square feet)	141.0(b)2E	<input type="checkbox"/> < 25,000 ft <sup>2</sup> <input type="checkbox"/> > 25,000 ft <sup>2</sup> <input type="checkbox"/> NA: Altered per 141.0(b)2E
04	Thermostats	110.2(b), (c)1, 120.2(a), 160.3(a)2A or 141.0(b)2E and 180.2(b)2	<input type="checkbox"/> Setback Thermostat <input type="checkbox"/> EMCS <input type="checkbox"/> Setback + DR Tstat per 110.12 <input type="checkbox"/> NA: Eq. type per 110.2(c) Excpt1
05	Shut-Off Controls	120.2(e) and 160.3(a)2D	<input type="checkbox"/> Auto Time Switch <input type="checkbox"/> Occ. Sensor <input type="checkbox"/> 4 Hour Timer <input type="checkbox"/> EMCS <input type="checkbox"/> NA: 7 day per section 120.2(e)1 <input type="checkbox"/> NA: Altered per section 141.0(b)2E <input type="checkbox"/> NA: Healthcare only <input type="checkbox"/> NA: HRR dwelling unit
06	Isolation Zone Controls	120.2(g) and 160.3(a)2F 141.0(b)2E	<input type="checkbox"/> Auto Time switch <input type="checkbox"/> Occ. Sensor <input type="checkbox"/> 4 Hour Timer <input type="checkbox"/> EMCS <input type="checkbox"/> NA: Continuous Heat/Cool <input type="checkbox"/> NA: Altered per 141.0(b)2E <input type="checkbox"/> NA: Single Zone <input type="checkbox"/> NA: Serves < 25k ft <sup>2</sup> <input type="checkbox"/> NA: dwelling unit
07	Demand Response	110.12, 120.2(b) and 160.3(a)2B	<input type="checkbox"/> EMCS <input type="checkbox"/> DR T-stat per 110.12 <input type="checkbox"/> NA: PTAC, PTHP, Rm AC, HP <input type="checkbox"/> NA: Healthcare only <input type="checkbox"/> NA: Serves temp. sensitive process



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Field	Field Name	Energy Code Section	Data Entry
08	Supply Air Temp. Reset	140.4(f) and 170.2(c)4D	<input type="checkbox"/> Included <input type="checkbox"/> NA: Alteration <input type="checkbox"/> NA: Single Zone <input type="checkbox"/> NA: Healthcare only <input type="checkbox"/> NA: Would increase energy use <input type="checkbox"/> NA: Serves humidity sensitive process <input type="checkbox"/> NA: Controls prevent reheat/re-cool/simultaneous <input type="checkbox"/> NA: dwelling unit
09	Window Interlocks	140.4(n) and 170.2(c)4D	<input type="checkbox"/> Provided <input type="checkbox"/> NA: Auto-closing doors <input type="checkbox"/> NA: No thermostatic control <input type="checkbox"/> NA: Alteration project <input type="checkbox"/> NA: No operable windows <input type="checkbox"/> NA: Healthcare only <input type="checkbox"/> NA: HRR dwelling unit
10	Direct Digital Control (DDC)	110.12	<input type="checkbox"/> Provided <input type="checkbox"/> NA: Single Zone

## Notes:

1. Gravity gas wall heaters, gravity floor heaters, gravity room heaters, non-central electric heaters, fireplaces or decorative gas appliances, wood stoves are not required to have setback thermostats.



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## J VENTILATION AND INDOOR AIR QUALITY

Complete the following tables to demonstrate compliance with mandatory and prescriptive ventilation requirements in §120.1, §120.2(e)3B, §140.4(p) and §140.4(q) for all nonresidential and §160.2, §160.3(a)3D, §170.2(a)4N, §170.2(a)4O for high-rise residential occupancies. For alterations, only ventilation systems being altered within the scope of the permit application need to be documented in this table. In lieu of this table, the required outdoor ventilation rates and airflows may be shown on the plans, or the calculations can be presented in a spreadsheet.

**Table J-1: Ventilation System Summary**

Field	Field Name	Data Entry
01	The project is showing ventilation calculations on the plans or attaching the calculations instead of completing this table.	<input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, STOP do not complete the remainder of Table J-1, Table J-2, or Table J-3.
02	The project includes nonresidential, hotel/motel spaces or multifamily common use spaces or new or altered multifamily dwelling units.	<input type="checkbox"/> Yes <input type="checkbox"/> No If "Yes" complete Table J-2.
03	The project is using natural ventilation in any nonresidential spaces to meet required ventilation rates per section 120.1(c)2.	<input type="checkbox"/> Yes <input type="checkbox"/> No If "Yes" complete Table J-3.
04	System Name/Tag	
05	System Design OA CFM Air Flow (See Note 1)	
06	System Design Transfer Air (CFM)	
07	Air Filtration	<input type="checkbox"/> Provided <input type="checkbox"/> NA: Not applicable system type (See Note 2)
08	Total System Required Min OA (CFM) (See Note 3)	
09	Table J-2 Complies (See Note 4)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
10	Table J-3 Complies (See Note 5)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

**Notes:**

1. System CFM should include both mechanical and natural ventilation for the zone/system.





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2. Air filtration requirements apply to the following three system types per section 120.1(c), 141.0(b)2, and 160.2(c)1: space conditioning systems utilizing ducts to supply air to occupiable space; supply-only ventilation systems providing outside air to occupiable space; supply side of balanced ventilation systems including heat recovery and energy recovery ventilation systems providing outside air to occupiable space.
3. Calculate the Total System Required Min OA (CFM) by summing all rows of Table J-2, Required Min OA (CFM).
4. Set Table J-2 Complies as follows:
  - a. "N/A" if the field "The project includes Multifamily Common Use Spaces" is set to "No."
  - b. "Yes" if BOTH (a) and (b) are true, otherwise set to "No":
    - i. System Design OA Air Flow+System Design Transfer Air is greater than Total System Required Min OA, and
    - ii. Table J-2, Provided per Design is greater than Table J-2, Required Min OA for all columns in Table J-2.
  - c. "No" if neither 4a nor 4b
5. Set Table J-3 Complies as follows:
  - a. "NA" if the field "The project includes new or altered multifamily dwelling units" is set to "No."
  - b. "Yes" if EITHER of the following two statements are true for all columns in J-3:
    - i. Mech. Ventilation Required Min OA is less than or equal to Design Ventilation Supply Air
    - ii. Mech. Ventilation Required Min OA is less than or equal to Design Ventilation Exhaust Air
  - c. "No" if neither 5a nor 5b



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**Table J-2: Multifamily Common Use Area Ventilation**

Complete Table J-2 for each multifamily common use area.

☐ Check here if additional tables are attached.

Field	Field Name	Energy Code Section	Space-1	Space-2	Space-3
01	Space Name/Tag	N/A			
02	Mech. Ventilation Occupancy Type	120.1(c)33 and 160.2(c)3 (See Note 1)			
03	Mech. Ventilation Conditioned Floor Area (square feet)	120.1(c)33 and 160.2(c)3			
04	Mech. Ventilation Number of shower heads and toilets	120.1(c)33 and 160.2(c)3 (See Note 5)			
05	Mech. Ventilation Number of people	120.1(c)33 and 160.2(c)3 (See Note 3)			
06	Mech. Ventilation Required Minimum Outside Air (CFM)	120.1(c)3 and 160.2(c)3 (See Note 6)			
07	Exh. Ventilation Required Minimum (CFM)	120.1(c)4 and 160.2(c)4 (See Note 7)			
08	Exh. Ventilation Provided per Design (CFM)	120.1(c)4 and 160.2(c)4 (See Note 7)			
09	DCV Controls (See Note 4 and 8)	120.1(d)3, 120.1(d)5 120.2(e)36, 160.2(c)5d, 160.2(c)5e and section 160.2(c)diii			
10	Occupancy Sensor Controls (See Note 4 and 9)	120.1(d)3, 120.1(d)5 120.2(e)36, 160.2(c)5d, 160.2(c)5e and section 160.2(c)diii			

Notes:

1. Mech. Ventilation Occupancy Type is limited to the occupancy types listed in the Energy Code Tables 120.1-A and 120.1-B.



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2. All mechanical ventilation is subject to the Uniform Mechanical Code may have more stringent ventilation requirements; the most stringent code requirement takes precedence.
3. For lecture halls with fixed seating, the expected number of occupants shall be determined in accordance with the California Building Code.
4. DCV and Occupancy Sensor Controls. Energy Code section 120.2(e)3 requires systems serving rooms that are required by section 130.1(c) to have lighting occupancy sensing controls to also have occupancy sensing zone controls for ventilation. Examples of spaces which require lighting occupancy sensors include offices 250 square feet or smaller, multipurpose rooms less than 1,000 square feet, classrooms, conference rooms, restrooms, aisles and open areas in warehouses, library book stack aisles, corridors, stairwells, parking garages, and loading and unloading zones, unless excepted by section 130.1(c).
5. Mech. Ventilation Number of shower heads and toilets is only used when Mech. Ventilation Occupancy Type is set to Shower Room or Toilet, otherwise it is set to zero.
6. Mech. Ventilation Required Minimum Outside Air is the greater of the following (a) or (b):
  - a. Mech. Ventilation Conditioned Floor Area multiplied by the appropriate minimum ventilation rate provided in the Energy Code Tables 120.1-A.
    - i. Note: The correct ventilation rate is determined by the entry in DCV Controls. If DCV Controls is set to "Provided", then the correct ventilation rate that should be used is the "Min Ventilation Air Rate for DCV" provided in Table 120.1-A. Otherwise, the correct ventilation rate used should be the "Total Outdoor Air Rate" provided in Table 120.1-A.
  - b. Mech. Ventilation Number of people multiplied by 15.0.
7. Exh. Ventilation Required Minimum is limited to one of the following:
  - a. If Mech. Ventilation Occupancy Type is anything OTHER THAN "Shower rooms" or "Toilets" Exh. Ventilation Required Minimum is set to Mech. Ventilation Conditioned Floor Area multiplied by the Exhaust Rate (cfm/ft<sup>2</sup>) as shown in Energy Code Table 120.1-B.
  - b. If Mech. Ventilation Occupancy Type is set to "Shower rooms" or "Toilets" 7. Exh. Ventilation Required Minimum is set to Mech. Ventilation Number of shower heads and toilets multiplied by x the Exhaust Rate (cfm/unit) as shown in Energy Code Table 120.1-B.
    - i. Note: If no value is shown in Exhaust Rate (cfm/unit) of Table 120.1-B, then enter "N/A" for Exh. Ventilation Required Minimum and Exh. Ventilation Provided per Design.
8. DCV Controls are limited to one of the following:
  - a. Provided per section 120.1(d)4
  - b. NA: Not required per Section 120.1(d)3
  - c. NA: Space exhaust is greater than design ventilation rate
  - d. NA: Processes that generate dust, fumes, etc. & no local exhaust
  - e. NA: Area is less than 150 square feet or design occupancy is less than 10 people
9. Occupancy Sensor Controls are limited to one of the following:
  - a. Provided per section 120.1(d)5
  - b. NA: Continuously operated per section 120.2(e)3
  - c. NA: System is less than 2kW demand and manual shutoff per section 120.2(e)3
  - d. NA: Hotel/motel and manual shutoff per section 120.2(e)3
  - e. NA: Not required space type



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**Table J-3: Multifamily Dwelling Unit Ventilation Systems**

Complete Table J-3 for each multifamily dwelling unit.

☐ Check here if additional tables are attached.

Field	Field Name	Energy Code Section	Dwelling-1	Dwelling-2	Dwelling-3
00	Continuous Ventilation	160.2(b)2Aivb2	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
01	Unit Name/Tag	N/A			
02	Mech. Ventilation Conditioned Floor Area (square feet)	120.1(b)2 and 160.2(b)2			
03	Mech. Ventilation Number of Bedrooms	120.1(b)2 and 160.2(b)2			
04	Mech. Ventilation Number of Units	120.1(b)2 and 160.2(b)2			
05	Mech. Ventilation Required Min OA (CFM)	120.1(b)2 and 160.2(b)2 (See Note 1)			
06	Design Ventilation Supply Air (CFM)	N/A			
07	Design Ventilation Exhaust (CFM)	N/A			
08	Local Exhaust	(See Note 2)	<input type="checkbox"/> Bathroom-Kitchen IAQ <input type="checkbox"/> Bathroom-Kitchen IAQ & Vent. <input type="checkbox"/> Kitchen Range Hood <input type="checkbox"/> N/A	<input type="checkbox"/> Bathroom-Kitchen IAQ <input type="checkbox"/> Bathroom-Kitchen IAQ & Vent. <input type="checkbox"/> Kitchen Range Hood <input type="checkbox"/> N/A	<input type="checkbox"/> Bathroom-Kitchen IAQ <input type="checkbox"/> Bathroom-Kitchen IAQ & Vent. <input type="checkbox"/> Kitchen Range Hood <input type="checkbox"/> N/A
09	Air Filtration	120.1(c) and 160.2(b)1 (See Notes 3 and 5)	<input type="checkbox"/> Provided <input type="checkbox"/> NA: Evap. Cooler	<input type="checkbox"/> Provided <input type="checkbox"/> NA: Evap. Cooler	<input type="checkbox"/> Provided <input type="checkbox"/> NA: Evap. Cooler
11	Balanced System	(See Notes 4 and 6)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

Notes:

1. Uniform Mechanical Code may have more stringent ventilation requirements; the most stringent code requirement takes precedence.
2. Kitchen range hood will be verified per NA7.18.1 to confirm model is rated by HVI or AHAM.



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3. Air filtration requirements apply to the following three system types per section 120.1(b)1A: space conditioning systems utilizing ducts to supply air to occupiable space; supply-only ventilation systems providing outside air to occupiable space; supply side of balanced ventilation systems including heat recovery and energy recovery ventilation systems providing outside air to occupiable space.
4. A balanced ventilation system provides ventilation airflow to each dwelling-unit at a rate equal to or greater than the required minimum rate, but not more than twenty percent greater.
5. Mech. Ventilation Required Min OA is calculated by multiplying Mech. Ventilation Number of Units by the sum of (a) and (b) as follows:
  - a. Multiply Mech. Ventilation Conditioned Floor Area by 0.03
  - b. Multiply 7.5 by the result of adding one to Mech. Ventilation Number of Bedrooms
6. Set Balanced System to one of the following:
  - a. "Yes" if (Design Ventilation Supply Air minus Design Ventilation Exhaust) divided by Design Ventilation Supply Air is less than or equal to 0.2 for all columns in Table J-3.
  - b. "N/A" if the system is using continuous ventilation (Table J-3, Field 00 set to "Yes") to meet the ventilation requirements per section 120.1(b)2Aivb & section 160.2(b)2Aivb2.
  - c. "No" for all other situations.

#### K. TERMINAL BOX CONTROLS

Table K Instructions: Complete Table K to demonstrate compliance with prescriptive zone control requirements in sections 140.4(d) and 170.2(c)4B for zones, systems, or VAV boxes.

**Table K: Terminal Box Controls**

☐ Check here if additional tables are attached.

Field	Field Name	Sys-1	Sys-2	Sys-3	Sys-4
01	Zone, System, VAV Box Name/Tag				
02	Zonal Control Strategy (See Note 1)				
03	Design Peak Primary Airflow (CFM)				
04	Design Primary Air in Deadband (CFM)				
05	Design Reheated Re-cooled Mixed Airflow (CFM)				
06	Deadband Compliance Outside Air (CFM)				
07	Deadband Compliance 30 percent of Peak Primary Airflow (CFM) (See Note 2)				



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Field	Field Name	Sys-1	Sys-2	Sys-3	Sys-4
08	Deadband Compliance Max Deadband Airflow (CFM) (See Note 3)				
09	Reheated, Re-cooled, Mixed Air Compliance 50% of Peak Primary Airflow				
10	Reheated, Re-cooled, Mixed Air Compliance 1st Stage Modulates <95oF and Maintains DB Rate	<input type="checkbox"/> Pass <input type="checkbox"/> Fail	<input type="checkbox"/> Pass <input type="checkbox"/> Fail	<input type="checkbox"/> Pass <input type="checkbox"/> Fail	<input type="checkbox"/> Pass <input type="checkbox"/> Fail
11	Reheated, Re-cooled, Mixed Air Compliance 2nd Stage Modulates from DB Flow to Heating Max Flow	<input type="checkbox"/> Pass <input type="checkbox"/> Fail	<input type="checkbox"/> Pass <input type="checkbox"/> Fail	<input type="checkbox"/> Pass <input type="checkbox"/> Fail	<input type="checkbox"/> Pass <input type="checkbox"/> Fail
12	Complies (See Note 5)	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

## Notes:

- Zonal Control Strategy is limited to the strategies listed in Section 140.4(d) as follows:
  - No Reheat, Re-cool, Mixing
  - VAV w DDC @ zone
  - VAV w/o DDC @ zone
  - NA: Pressurization control
  - NA: Reheat via site/solar source
  - NA: Humidity control
  - NA: Peak SA < 300 CFM
  - NA: Healthcare Facility.
- Deadband Compliance, 30 percent of Peak Primary Airflow (CFM) is calculated by multiplying the value for Design Peak Primary Airflow(CFM) by 0.3 if Zonal Control Strategy is set to "VAV w/o DDC." Otherwise enter "N/A."
- Deadband Compliance, Max Deadband Airflow (CFM) is dictated by the entry made in Zonal Control Strategy as follows:
  - If Zonal Control Strategy is set to "VAV w DDC @ Zone," then Deadband Compliance, Max Deadband Airflow (CFM) is set equal to Deadband Compliance, Outside Air (CFM).
  - If Zonal Control Strategy is set to "VAV w/o DDC @ Zone," then Deadband Compliance, Max Deadband Airflow (CFM) is set to the larger value entered in either Deadband Compliance, Outside Air (CFM) or Deadband Compliance, 30 percent of Peak Primary Airflow (CFM).
  - For all other entries in Zonal Control Strategy, Deadband Compliance, Max Deadband Airflow (CFM) is set to "N/A."
- Reheated, Re-cooled, Mixed Air Compliance, 50% of Peak Primary Airflow is calculated by multiplying Design, Peak Primary Airflow (CFM) by 0.50.
- Table K complies and is set to "Yes" if a, b, or c are true:



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- a. If Zonal Control Strategy is set to any of the following:
  - i. - No Reheat, Re-cool, Mixing
  - ii. - NA: Pressurization Control
  - iii. - NA: Reheat via site/solar source
  - iv. - NA: Humidity Control
  - v. - NA: Peak SA < 300 CFM
  - vi. - NA: Healthcare Facility
- b. If all of the following are true:
  - i. Zonal Control Strategy is set to "VAV w/o DDC@zone"
  - ii. Design, Reheated Re-cooled Mixed Airflow is less than 08 CFM
- c. If all of the following are true:
  - i. Zonal Control Strategy is set to "VAV w DDC@zone"
  - ii. Design, Reheated Re-cooled Mixed Airflow is less than either Reheated, Re-cooled, Mixed Air Compliance, 50% of Peak Primary Airflow or Deadband Compliance, Outside Air (09 AND 06)
  - iii. Design, Reheated Re-cooled Mixed Airflow is less than 08 CFM
  - iv. Both Reheated, Re-cooled, Mixed Air Compliance, 1st Stage Modulates <95oF and Maintains DB Rate and Reheated, Re-cooled, Mixed Air Compliance, 2nd Stage Modulates from DB Flow to Heating Max Flow are set to "Pass."



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## L. DISTRIBUTION (DUCTWORK and PIPING)

This table is used to demonstrate compliance with mandatory pipe insulation requirements found in section 120.3 and mandatory requirements found in section 120.4 and 160.3(b) for duct sealing.

**Table L-1: Mandatory Pipe Insulation**

Insulation shall be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind. Insulation exposed to weather shall be installed with a cover suitable for outdoor service. Insulation covering chilled water piping and refrigerant suction piping located outside the conditioned space shall have a Class I or Class II vapor retarder. All penetrations and joints of which shall be sealed.

Field	Field Name	Energy Code Section	Piping System Entry
01	System Type	N/A	<input type="checkbox"/> Space heating <input type="checkbox"/> Space cooling
02	Nominal Pipe Diameter (in)	N/A	<input type="checkbox"/> Less than 1 inch <input type="checkbox"/> 1 to less than 1.5 inches <input type="checkbox"/> 1.5 to less than 4 inches <input type="checkbox"/> 4 to less than 8 inches <input type="checkbox"/> 8 inches or more
03	Fluid Temperature Range (°F)	N/A	<input type="checkbox"/> Heating Above 350 <input type="checkbox"/> Heating 251-350 <input type="checkbox"/> Heating 201-250 <input type="checkbox"/> Heating 141-200 <input type="checkbox"/> Heating 105-140 <input type="checkbox"/> Cooling 40-60 <input type="checkbox"/> Cooling below 40
04	Conductivity Range (Btu-in/hr/ft <sup>2</sup> /°F)	N/A (See Note 1)	<input type="checkbox"/> 0.32 - 0.34 <input type="checkbox"/> 0.29 - 0.32 <input type="checkbox"/> 0.27 - 0.30 <input type="checkbox"/> 0.25 - 0.29 <input type="checkbox"/> 0.22 - 0.28 <input type="checkbox"/> 0.21 - 0.27 <input type="checkbox"/> 0.20 - 0.26 <input type="checkbox"/> Other
05	Insulation Mean Rating Temp. (°F)	Table 120.3-A (See Note 2)	
06	Min. Insulation Thickness Required (in)	Table 120.3-A	
07	Min. Insulation Thickness Required (in)	120.3(c)2 and 160.3(c)1dii	
08	Insulation Thickness per Design (in)	N/A	





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Field	Field Name	Energy Code Section	Piping System Entry
09	Exception, if applicable	120.3 and 160.3(c)	<input type="checkbox"/> No exception taken <input type="checkbox"/> Factory installed piping within certified equip. <input type="checkbox"/> Fluid design operating temp. 60-105°F <input type="checkbox"/> Lack of insulation will not increase energy use
10	Serving Res or nonresidential Space	N/A	<input type="checkbox"/> Residential <input type="checkbox"/> Nonresidential

Note:

- The entry for Conductivity Range is based on the entry in Fluid Temperature Range as indicated in Table L-1; Note Table 1

**Note Table 1: Conductivity Range Options Lookup**

Fluid Temperature Range	Conductivity Range Option 1	Conductivity Range Option 2
Heating Above 350	0.32 - 0.34	Other
Heating 251-350	0.29 - 0.32	Other
Heating 201-250	0.27 - 0.30	Other
Heating 141-200	0.25 - 0.29	Other
Heating 105-140	0.22 - 0.28	Other
Cooling 40-60	0.21 - 0.27	Other
Cooling below 40	0.20 - 0.26	Other

- Using the entry selected in Conductivity Range, lookup the Insulation Mean Rating Temp. (°F) Value from Table 120.3-A.
  - If Conductivity Range is set to "Other," set Insulation Mean Rating Temp to "N/A."
- Using the entries selected in Nominal Pipe Diameter and Fluid Temperature Range, lookup the Min. Insulation Thickness Required in Table 120.3-A.
  - If Conductivity Range is set to "Other," set Fluid Temperature Range to "N/A."
- If Conductivity Range is set to "Other," enter the Min. Insulation Thickness Required as indicated by Sections 120.3(c)2 and 160.3(c)1dii, otherwise set to "N/A."

**Table L-2: Duct Leakage Testing**
☐ Check here if additional tables are attached.

Field	Field Name	Ducting-1	Ducting-2
01	Duct system Name/Tag		
02	The scope of the project includes only duct systems serving healthcare facilities.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No



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Field	Field Name	Ducting-1	Ducting-2
03	Duct system provides conditioned air to an occupiable space for a constant volume, single zone, space-conditioning system.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
04	The space conditioning system serves less than 5,000 ft <sup>2</sup> of conditioned floor area.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
05	The combined surface area of the ducts located outdoors or in unconditioned spaces is more than 25% of the total surface area of the entire duct system:	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
06	The scope of the project includes extending an existing duct system, which is constructed, insulated or sealed with asbestos.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
07	The scope of the project includes an existing duct system that is documented to have been previously sealed as confirmed through field verification and diagnostic testing in accordance with procedures in the Reference Nonresidential Appendix NA2.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
08	All Ductwork and plenums with pressure class ratings shall be constructed to Seal Class A. (Set to "N/A" if Exposed Ductwork located in occupied space)	<input type="checkbox"/> Yes <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> N/A
09	All ductwork is an extension of an existing duct system	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
10	Ductwork serving individual dwelling unit	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
11	Less than 25 ft of new or replacement space conditioning ducts installed (See Note 1)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
12	Duct Insulation R-Value (See Note 2)		
13	NR/Common Use: duct leakage testing does not exceed the indicated amount. (See Note 3)	<input type="checkbox"/> 6% Pass <input type="checkbox"/> 15% Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A	<input type="checkbox"/> 6% Pass <input type="checkbox"/> 15% Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
14	Dwelling Units (See Note 4)	<input type="checkbox"/> Pass <input type="checkbox"/> Fail	<input type="checkbox"/> Pass <input type="checkbox"/> Fail



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Field	Field Name	Ducting-1	Ducting-2
15	CMC Section 603.10.1 Duct leakage testing required (See Note 5)	<input type="checkbox"/> Required <input type="checkbox"/> N/A	<input type="checkbox"/> Required <input type="checkbox"/> N/A

## Notes:

1. Set Field 11 to "N/A" unless Field 09 is set to "Yes."
2. Set Field 11 to "N/A" unless Field 09 is set to "Yes "
3. Set Field 13 as follows:
  - a. Set Field 13 to "6% Pass" if all of the following are true:
    - i. Field 8 is set to "No"
    - ii. Fields 3, 4, and 5 are all set to "Yes"
    - iii. Fields 2, 6 and 7 are all set to "No"
    - iv. The required duct leakage testing does not exceed 6 percent.
      1. If the required duct leakage testing exceeds 6 percent, then set Field 13 to "Fail."
  - b. Set Field 13 to "15% Pass" if all of the following are true:
    - i. Field 8 is set to "Yes"
    - ii. Fields 3, 4, and 5 are all set to "Yes"
    - iii. Fields 2, 6 and 7 are all set to "No"
    - iv. The required duct leakage testing does not exceed 15 percent.
      1. If the required duct leakage testing exceeds 15 percent, then set Field 13 to "Fail."
  - c. Set Field 13 to "N/A" if any of the following are false:
    - i. Fields 3, 4, and 5 are set to "Yes"
    - ii. Fields 2, 6 and 7 are set to "No"
4. For Field 14; Total duct leakage of duct system and duct leakage system to outside must be tested as required by Reference Appendix RA3.1.4. Set Field 14 as follows:
  - a. Set Field 14 to "Pass" if all of the following are true:
    - i. if Field 09 is set to "Yes"
    - ii. Field 08 is set to "No".
    - iii. Duct system leakage (RA3.1.4) is less than or equal to 12 percent.
    - iv. Leakage to outside (RA3.1.4) is less than or equal to 6 percent.
  - b. Set Field 14 to "Pass" if all of the following are true:
    - i. Field 09 is set to "Yes"
    - ii. Field 10 is set to "No"
    - iii. Duct system leakage (RA3.1.4) is less than or equal to 15 percent.
    - iv. Leakage to outside (RA3.1.4) is less than or equal to 10 percent.
  - c. If neither Note 4a nor Note 4b are true, then set Field 14 to "Fail."
5. Set Field 15 to "Required" if both of the following are true, else set to "N/A":
  - a. Nonresidential Duct Leakage Testing (NA7.5.3) is not required
  - b. Residential Duct Leakage Testing (RA3.1.4.3) is not required



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## M. COOLING TOWERS

Table M is used to demonstrate compliance with mandatory requirements in section 110.2(e)2 for cooling towers with a rated capacity greater than 150 tons. Table M calculates the maximum cycles of concentration using the Langelier Saturation Index (LSI) calculations per section 110.2(e)2.

**Table M: Cooling Tower Maximum Cycles of Concentration**

☐ Table M may be omitted if the project is showing calculations on the plans or attaching the calculations (check this box).

☐ Check here if additional tables are attached.

Field	Field Name	Tower 1	Tower 2	Tower 3
01	Name/Tag			
02	Design Conditions Design GPM			
03	Design Conditions Min Flow GPM			
04	Related Conditions GPM/HP			
05	Maximum Skin Temp (°F)			
06	Conductivity			
07	M-Alkalinity			
08	Calcium Hardness			
09	Magnesium Hardness			
10	Target Tower Cycles			
11	Calculation pH @ Target Cycles (See Note 3)			
12	Calculation pH Saturation @ Target Cycles (See Note 4)			
13	Calculation Tower LSI Based on Calculated pH (See Note 5)			
14	Complies (See Note 6)	<input type="checkbox"/> Pass <input type="checkbox"/> Fail	<input type="checkbox"/> Pass <input type="checkbox"/> Fail	<input type="checkbox"/> Pass <input type="checkbox"/> Fail

**Notes:**

1. Open-circuit cooling tower is defined as an open, or direct contact, cooling tower which exposes water directly to the cooling atmosphere, thereby transferring the source heat load from the water directly to the air by a combination of heat and mass transfer.
2. Closed-circuit cooling tower is defined as a cooling tower that utilizes indirect contact between a heated fluid, typically water or glycol, and the cooling atmosphere to transfer the source heat load through sensible heat, latent heat, and mass transfer indirectly to the air, essentially combining a heat exchanger and cooling tower into an integrated and relatively compact device.
3. Perform the following calculation and enter the results in "pH @ Target Cycles":



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- a. Multiply the following together: 1.219, 0.9, M-Alkalinity, and Target Tower Cycles.
  - b. Calculate the logarithm (base 10) of the result of Note 3a.
  - c. Add 2.19 to the results of Note 3b
  - d. Divide the result of Note 3c by 0.55 and enter the result in in “pH @ Target Cycles.”
4. Perform the following calculation and enter the results in “pH Saturation @ Target Cycles”:
  - a. Multiply the following together: 0.8, Conductivity, and Target Tower Cycles.
  - b. Calculate the logarithm (base 10) of the result of Note 4a.
  - c. Multiply the result of Note 4b by 0.1111 and add 12.3 to the result.
  - d. Multiply the following together: Calcium Hardness, Target Tower Cycles, M-Alkalinity, and Target Tower Cycles (again).
  - e. Calculate the logarithm (base 10) of the result of Note 4d.
  - f. Multiply 0.00915 by Maximum Skin Temp (°F).
  - g. Add together the results of Note 4e and Note 4f.
  - h. Subtract the results of Note 4g from the results of Note 4c and enter the result in “pH Saturation @ Target Cycles.”
5. Perform the following calculation and enter the result in “Tower LSI Based on Calculated pH”
  - a. Subtract pH Saturation @ Target Cycles from pH @ Target Cycles.
6. Select “Pass” if Tower LSI Based on Calculated pH is greater than 2.5, else select “Fail.”

#### **N. DECLARATION OF REQUIRED CERTIFICATES OF INSTALLATION**

Table N shows the Certificates of Installation that must be completed by the installation technician or contractor. The determination of requiring each certificate is included in Table N. The number of required tests must be set to zero (for none) or any whole number. The Name/Tag of the installation to be tested must also be identified, matching the number of tests required. For example, if five LMCI-MCH-20-H duct tests are required, then the table must list five installation name/tags.



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**Table N: Required Certificates of Installation**

Field	Certificate of Installation	Trigger	No. Req.	List each Name/Tag Triggering the Certificate	AHJ Field Inspector
01	LMCI-MCH-01-E (This form)	Required for each building on the project site.			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
02	LMCI-MCH-20-H Duct Leakage Diagnostic Test	Required if Table L-2, Field 14 (Duct Leakage Testing) or Field 15 (Dwelling Units) are set to "Yes"			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
03	LMCI-MCH-21-H Duct Location Verification	Required for most new or altered duct system. (See Note 1)			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
04	LMCI-MCH-22-H Fan Efficacy	Required if Table H-1, Field 5 (Serving Dwelling Units) is set to "Serving Individual Dwelling Units"			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
05	LMCI-MCH-23-H Airflow Rate	Required if Table H-1, Field 5 (Serving Dwelling Units) is set to "Serving Individual Dwelling Units"			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
06	LMCI-MCH-24-H Building Envelope Air Leakage Worksheet	Required if Table J-3, Field 00 is set to "Yes"			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
07	LMCI-MCH-25-H Refrigerant Charge Verification	Required if Table F-1, Field 01 is set to "Individual Dwelling Unit" and Table 170.2-K requires Refrigerant charge verification based on climate zone in Table A-1, Field 01			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
08	LMCI-MCH-26-H Rated Space Conditioning System Equipment Verification	Required if Table F-2, Field 02 is set to "Unitary Heat Pump," "Unitary Heat Pump (no elec resistance)" or "Dual Fuel Heat Pump"			<input type="checkbox"/> Pass <input type="checkbox"/> Fail



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Field	Certificate of Installation	Trigger	No. Req.	List each Name/Tag Triggering the Certificate	AHJ Field Inspector
09	LMCI-MCH-27b-H Indoor Air Quality and Mechanical Ventilation	Required for newly constructed and additions greater than 1,000 square feet			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
10	LMCI-MCH-28-H Return Duct Design and Air Filter Grille Device Sizing	Required for some new duct return installations. (See Note 2)			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
11	LMCI-MCH-29-H Duct Surface Area Reduction; Buried Ducts Compliance Credit	Required for duct surface reduction, duct R-value, and buried ducts compliance credits.			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
12	LMCI-MCH-32-H Local Mechanical Exhaust	Required if Table J-3, Field 8 is set to Kitchen Range hood			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
13	LMCI-MCH-33-H Variable Capacity Heat Pump Compliance Credit	Required for variable capacity heat pump compliance credit.			<input type="checkbox"/> Pass <input type="checkbox"/> Fail

## Notes:

1. LMCI-MCH-21-H: (Section RA3.1.4.1.1.4) The location of all supply and return registers shall be verified by inspection of the interior of the dwelling unit. The location of the space conditioning equipment and the size, R-value, and location of each duct segment shall be verified by observation in the spaces where they are located. Deviations from the approved Duct Design Layout shall not be allowed without a revised a Duct Design Layout approved by the enforcement agency.
2. Required to confirm that the return duct design conforms to the applicable criteria given in Table 150.0-B, Table 150.0-C, Table 160.3-A, or Table 160.3-B.



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## O. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE

Table O shows the Certificates of Acceptance that must be completed by an Acceptance Test Technician (ATT) with a valid and current certification from an Energy Commission approve Acceptance Test Technician Certification Provider (ATTCP). The determination of requiring each certificate is included in Table O. The number of required tests must be set to zero (for none) or any whole number. The Name/Tag of the installation to be tested must also be identified, matching the number of tests required. For example, if three NRCA-MCH-04-A duct tests are required, then the table must list three installation name/tags.

**Table O: Required Certificates of Acceptance**

Field	Certificate of Installation	Trigger	No. Req.	List each Name/Tag Triggering the Certificate	AHJ Field Inspector
01	NRCA-MCH-02-A Outdoor Air	Required if Table B, Field 16 is selected			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
02	NRCA-MCH-03-A Constant Volume	Required if Constant Volume Single Zone HVAC Systems are included in the scope			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
03	NRCA-MCH-04-A Air Distribution Duct Leakage	Required if Table B, Field 16 is selected and Table L-2, Fields 3, 4, and 5 are set to "Yes"			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
04	NRCA-MCH-05-A Air Economizer Controls	Required if Table H-1, Field 8 is set to one of the following: "Fixed Temp., Fixed Enthalpy, Diff Temp., OR Diff Enthalpy"			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
05	NRCA-MCH-06-A Demand Control Ventilation (See Note 1)	Required if Table J-2, Field 9 is set to "Provided per section120.1(d)4"			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
06	NRCA-MCH-07-A Supply Fan Variable Flow Controls	Require if Table H-1, Field 4 is set to multizone VAV systems and Table H-2, Field 2 is set to Supply			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
07	NRCA-MCH-08-A Valve Leakage Test	Required if Table G, Field 05 is set to "Yes"			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
08	NRCA-MCH-09-A Supply Water Temperature Reset Controls	Required if Table F-6, Field 9 is set to "Yes" or Table F-7, Field 10 is set to "Yes"			<input type="checkbox"/> Pass <input type="checkbox"/> Fail





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Field	Certificate of Installation	Trigger	No. Req.	List each Name/Tag Triggering the Certificate	AHJ Field Inspector
09	NRCA-MCH-10-A Hydronic System Variable Flow Controls	Required if Table G, Field 5 is set to "Yes"			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
10	NRCA-MCH-11-A Automatic Demand Shed Controls	Required if Table I, Field 2 is set to "multi- zone w/ DDC to zone"			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
11	NRCA-MCH-12-A FDD for Packaged Direct Expansion Units	Required if Table O, row/Field 5 "No. Req." is non-zero and Table F-2, Field 2 is set to "Unitary AC/ Condensers"			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
12	NRCA-MCH-13-A Automatic FDD for Air Handling Units and Zone Terminal Units Acceptance	Required if Table O, row/Field 5 "No. Req." is non-zero and Table F-2, Field 2 is set to "Unitary AC/ Condensers", "PTAC/PTHP", "SPVAC/SPVHP", "Heat Pump + AC", or "Furnace + AC"			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
13	NRCA-MCH-14-A Distributed Energy Storage	Required if Distributed Energy Storage DX AC Systems are included in the scope of the project.			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
14	NRCA-MCH-15-A Thermal Energy Storage	See Note 2			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
15	NRCA-MCH-16-A Supply Air Temperature Reset Controls	Required if Table I, Field 8 is set to "Included"			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
16	NRCA-MCH-17-A Condenser Water Temperature Reset Controls	Required if Table F-11, Field 12 is set to "Yes"			<input type="checkbox"/> Pass <input type="checkbox"/> Fail



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Field	Certificate of Installation	Trigger	No. Req.	List each Name/Tag Triggering the Certificate	AHJ Field Inspector
17	NRCA-MCH-18-A Energy Management Control Systems	Required if Table I, Fields 4, 5, 6 or 7 are set to an "EMCS" selection.			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
18	NRCA-MCH-19-A Occupancy Sensor Controls	Required if either Table I, Field 5 is "Occ. Sensor" or Table J-2, Field 10 is set to "Provided per section120.1(d)5"			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
19	NRCA-MCH-20-A Multi-Family Ventilation	Required if Table B, Field 16 is selected and Table A, Field 16 is set to "Low-Rise Res"			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
20	NRCA-MCH-21-A Multi-Family Envelope Leakage	Required if Table J-3, Field 11 is set to "No"			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
21	NRCA-MCH-22-A MF Duct Leakage	Required if Table L-2, Field 14 is set to "Pass".			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
22	NRCA-MCH-23-A MF HRV/ERV Verification	Required if Table H-3, Field 9 is set to any option that include the word "...provided"			<input type="checkbox"/> Pass <input type="checkbox"/> Fail

## Note:

1. NRCA-MCH-06-A Demand Control Ventilation required to employ demand-controlled ventilation (refer to section120.1(c)3) can vary outside ventilation flow rates based on maintaining interior carbon dioxide (CO2) concentration setpoints.
2. Required if Chilled Water Storage, Ice-on-Coil Internal Melt, Ice-on-Coil External Melt, Ice Harvester, Brine, Ice-Slurry, Eutectic Salt, Clathrate Hydrate Slurry (CHS), Cryogenic or Encapsulated (Ice Ball) Systems are included in the scope of the project.



NOT REGISTERED - CAN BE USED FOR SUBMISSION TO BUILDING DEPARTMENTS PRIOR TO MARCH 31, 2023

#### P. DECLARATION OF REQUIRED CERTIFICATIONS OF VERIFICATION

Table P shows the Certificates of Verification that must be completed. These documents may be complete by either an Acceptance Test Technician (ATT) with a valid and current certification from an Energy Commission approved Acceptance Test Technician Certification Provider (ATTCP) or by a Home Energy Rating System (HERS) Rater with a valid and current certification from an Energy Commission approved HERS Provider. The determination of the ATT or HERS Rater completing these Certificates of Verification is made by the project owner and ratified by the authority having jurisdiction (Reference Appendix NA1.9). The determination of requiring each certificate is included in Table P. The number of required tests must be set to zero (for none) or any whole number. The Name/Tag of the installation to be tested must also be identified, matching the number of tests required. For example, if three NRCV-MCH-04-H duct tests are required, then the table must list three installation name/tags.

**Table P: Required Certificates of Verification**

Field	Certificate of Verification	Trigger	No. Req.	List each Name/Tag Triggering the Certificate	AHJ Field Inspector
01	LMCV-MCH-04-H Duct Leakage Test	(See Note 1)			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
02	LMCV-MCH-24-H Enclosure Air Leakage Worksheet	(See Note 2)			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
03	LMCV-MCH-27-H Indoor Air Quality and Mechanical Ventilation	Required if Table J-3, Field 8 is set to "Bathroom IAQ & Vent."			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
04	LMCV-MCH-32-H Local Mechanical Exhaust	Required if Table J-3, Field 8 is not set to "N/A"			<input type="checkbox"/> Pass <input type="checkbox"/> Fail

**Notes:**

1. LMCV-MCH-04-H is required if NRCA-MCH-04-A is also required (Table O, Field 3). However, at the discretion of the project owner (and approval from the authority having jurisdiction), LMCV-MCH-04-H can be omitted, relying on the results from the NRCA-MCH-04-A as completed by a certified ATT.
2. LMCV-MCH-24-H is required if Table A, Field 2 is set to "Low-Rise Residential", Table B, Field 16 "Ventilation" is selected, and Table J-3, Field 11 "Balanced Ventilation" is set to "Yes."



NOT REGISTERED - CAN BE USED FOR SUBMISSION TO BUILDING DEPARTMENTS PRIOR TO MARCH 31, 2023

#### Q. MANDATORY MEASURES DOCUMENTATION LOCATION

This table is used to indicate where mandatory measures are documented in the plan set or construction documentation.

**Table Q: Mandatory Measures**

Indicate where mandatory measures are documented in the plan set or construction documentation. For any mandatory measures that do not apply, mark the plan sheet or construction document location as "N/A."

Field	Measure	Energy Code Section	Required	Plan-Sheet/Document
01	Compliance with Mandatory Measures documented through MCH Mandatory Measures Note Block	N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No	
02	Heating Equipment Efficiency	110.1	<input type="checkbox"/> Yes <input type="checkbox"/> No	
03	Cooling Equipment Efficiency	110.1	<input type="checkbox"/> Yes <input type="checkbox"/> No	
04	Furnace Standby Loss Control	110.2(d)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
05	Duct Insulation	120.4	<input type="checkbox"/> Yes <input type="checkbox"/> No	
06	Heating Hot Water Equipment Efficiency	110.1	<input type="checkbox"/> Yes <input type="checkbox"/> No	
07	Cooling Chilled and Condenser Water Equipment Efficiency	110.1	<input type="checkbox"/> Yes <input type="checkbox"/> No	
08	Open and Closed-Circuit Cooling Towers conductivity of flow-based controls	110.2(e)1	<input type="checkbox"/> Yes <input type="checkbox"/> No	
09	Open and Closed-Circuit Cooling Towers Flow Meter with analog output	110.2(e)3	<input type="checkbox"/> Yes <input type="checkbox"/> No	
10	Open and Closed-Circuit Cooling Towers Overflow Alarm	110.2(e)4	<input type="checkbox"/> Yes <input type="checkbox"/> No	
11	Open and Closed-Circuit Cooling Towers Efficient Drift Eliminators	110.2(e)5	<input type="checkbox"/> Yes <input type="checkbox"/> No	
12	Pipe Insulation	120.3(b)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
13	Combustion air shutoff, combustion air fan controls and stack design and controls for boilers	120.9	<input type="checkbox"/> Yes <input type="checkbox"/> No	



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Field	Measure	Energy Code Section	Required	Plan-Sheet/Document
14	Heat Pump with Supplementary Electric Resistance Heater Controls	110.2(b)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
15	The air duct and plenum system	120.4(a)-(f)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
16	Kitchen range hoods, rated for sound	Section 7.2 of ASHRAE 62.2	<input type="checkbox"/> Yes <input type="checkbox"/> No	



NOT REGISTERED - CAN BE USED FOR SUBMISSION TO BUILDING DEPARTMENTS PRIOR TO MARCH 31, 2023

**DOCUMENTATION AUTHOR'S DECLARATION STATEMENT**

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

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

**Responsible Person's Declaration Statement**

2. 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 understand that a registered 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.
  6. I understand that a registered 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

For assistance or questions regarding the Energy Standards, contact the Energy Hotline at: 1-800-772-3300