Title 24 2025 Analysis ACM Specifications

This document describes inputs used for the analysis of the proposed addition of Section 140.4(a)3 to the Energy Code. It is supplemented by the T24-25 MZHP Model Inputs spreadsheet.

# 2022 Prescriptive Prototype Systems (Baseline)

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| **System Type** | **Description** | **Detail** |
| System 5 – PVAV  This system is used by the Medium Office. | Packaged VAV | Multizone packaged system with variable-volume fan, direct expansion cooling, gas furnace heating, and hot water reheat terminal units served by a central gas boiler. |
| System 6 – VAV  This system is used by the Large Office and Large School. | Built-up VAV | Multizone built-up system with variable-volume fan, chilled water cooling provided by a central water cooled chiller and cooling tower, and hot water heating provided by central gas boiler. |

The specifications for the modeling of the 2022 Prescriptive Prototype Systems that are not included in the T24-25 MZHP Model Inputs spreadsheet, and not in the CEC Prototypes as distributed for analysis, can be found in the 2022 ACM.

# 2025 Proposed Prototype Systems

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| --- | --- | --- |
| **System Type** | **Description** | **Detail** |
| System 14 – AWHP+FPFC+DOAS  This system is modeled in both the Large Office and Large School. | Air-to-water heat pump with four‑pipe fan coil units and DOAS | Zonal four‑pipe fan coil units with three‑speed fans and DOAS with heat recovery providing ventilation. Chilled water cooling provided by a central water-cooled chiller and cooling tower, and space‑heating hot water provided by a non-modular AWHP with supplemental electric resistance boiler. |
| System 15 – VRF+DOAS  This system is modeled in the Medium Office prototype. | VRF system with DOAS | Zonal VRF units with three‑speed fans and DOAS with heat recovery providing ventilation. |

1. The specifications for the modeling of the 2025 Proposed Prototype Systems that are not included in the T24-25 MZHP Model Inputs spreadsheet, and not in the CEC Prototypes as distributed for analysis, can be found in the 2022 ACM, except for the following:

AWHP Rated Heating Capacity

Sized to 50 percent of the full heating design load at design conditions.

AWHP Count

One AWHP serves all the load.

AWHP Supplemental Boiler Rated Heating Capacity

Sized to 50 percent of the full heating design load at design conditions.

AWHP Supplemental Boiler Count

One supplemental boiler serves all the load.

AWHP Rated Inlet Air Drybulb

47°F.

AWHP Rated Inlet Water Temperature

120°F.

AWHP Compressor Location

Outdoors.

AWHP Compressor Setpoint

122.5°F.

AWHP Tank Location

Outdoors. For all others, not applicable.

AWHP Tank Heating Element Setpoint

127.0°F.

AWHP Tank Heating Element Deadband

0.5°F.

AWHP Hot Water Supply Temperature Reset

Fixed (no reset).

System 14 Pump Design Head

For chilled water pumps:

HeadCHW = 1.2 \* ((40 ft) + (0.03 ft/ton) x [chiller plant nominal capacity (tons)]

(not to exceed 100 ft))

For condenser water pumps: 45 ft

VRF Indoor Unit Type

1. Ducted.

VRF Outdoor Unit Count

1. 1 per floor of the Medium Office, serving all zones of that floor.
2. VRF Design Supply Air Temperature (Cooling)
3. 55°F.
4. VRF Design Supply Air Temperature (Heating)
5. 95°F.
6. VRF Net Cooling Capacity
7. auto-sized by compliance software.
8. VRF Net Heating Capacity
9. auto-sized by compliance software.
10. VRF Supply Fan Capacity for Cooling
11. auto-sized by compliance software.
12. VRF Supply Fan Capacity for Heating
13. auto-sized by compliance software.
14. VRF Supply Fan Capacity for Deadband
15. 0 cfm.
16. VRF Supply Temp Control
17. No Supply Air Temperature Control.
18. VRF Auxiliary Power When On
19. 0 Btu/h.
20. VRF Auxiliary Power When Off
21. 0 Btu/h.

VRF Heat Recovery

Yes.

VRF Control Priority

Load Priority.

VRF Minimum Part-Load Ratio

0.25.

VRF Rated EER

The minimum heating efficiency from the Energy Code for the given capacity.

VRF Rated COP

The minimum heating efficiency from the Energy Code for the given capacity.

VRF Equivalent Pipe Length

48 ft.

VRF Max Vertical Height

11 ft.

VRF Defrost Heat Source

Electric.

VRF Defrost Control Strategy

OnDemand.

VRF Max Defrost Temp

40°F.

VRF Compressor Quantity

1.

VRF Crankcase Heater Capacity

0 W.

VRF Crankcase Heater Shutoff Temperature

40°F.

Zone Indoor Unit Fan Cycling

Cycles with loads.

Fan Power Index

Zone Indoor unit fans: 0.35 W/cfm

DOAS supply fan: 0.626 W/cfm

DOAS return fan: 0.144 W/cfm

Multi-speed Fan Power Ratio

51 percent power at 66 percent flow, 12 percent power at 33 percent flow