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Comments on Modulating DOAS Title 24 2028 Energy Code Pre-Rulemaking

Additional submitted attachment is included below.

May 31st, 2026
Via Electronic Mail

California Energy Commission
715 P Street
Sacramento, CA 95814

Re: CEC Docket: 2028 Title 24, Part 6 Draft CASE Report HVAC Air Distribution, Section 3 Modulating DOAS

The following comments are submitted for the record of the Commission's above-captioned rulemaking regarding 2028 Energy Code Pre-Rulemaking.

I am a mechanical engineer who has worked as a design engineer, controls designer, and commissioning agent, and has led code development for the IECC and state energy codes.

Overview

Please consider my comments related to the modulating DOAS code proposal

6. Modulating DOAS. DOAS systems in buildings with design outdoor airflow rates > 3,000 cfm shall meet all of the following:

- A. Include modulating pressure independent air valves or other means of independently modulating outside air at each space conditioning zone
- B. Disable ventilation to unoccupied space conditioning zones while maintaining measured outside air ventilation rates to occupied zones per 120.1(d)5
- C. Include demand ventilation controls for high density spaces per 120.1(d)4
- D. Modulate DOAS supply fan speed in accordance with 140.4(c)2

Exception to Section 120.1(d)6: Additions or alterations to existing DOAS systems permitted before 2029 that do not include modulating pressure independent air valves or other means of independently modulating outside air at each space conditioning zone.

Concerns of unintended consequences from these code provisions

I appreciate that CEC is looking for ways for the State of California to save energy cost-effectively for its citizens. However, I think some of the measures would likely have unintended market consequences if not addressed. For each of the measures, I will address my concerns and suggestions:

Measure A

It appears that this measure is treating DOAS systems the same as VAV systems. It should be noted that in the VAV system, the full amount of air for heating and cooling the zone is controlled by an air valve, which is much less than in a system providing ventilation air. It is not clear whether a building with more than 3000 cfm of OSA could be served by multiple DOAS systems that provide less than 3000 cfm of OSA, or whether you would need to provide modulating air at each zone of the building if more than 3000 cfm of OSA is required. This should be clarified. Also, it is not clear from the language of this measure whether a Therma-Fuser controlled by a CO2 sensor or by another binary control device would suffice as a control for a zone.

The result of this code provision could be that buildings over 20,000 ft² (assuming a rule-of-thumb

ventilation rate of 0.15 cfm/ft² of the total building square footage; 3,000 cfm / 0.15 cfm/ft² = 20,000 ft²) would likely not use DOAS systems. I understand that ventilation control may make sense when you reach a system capacity over 3000 cfm in certain spaces, but not in every space. I would propose achieving savings through new Title 24 code provisions for measure A, similar to Washington State Energy Code Section C403.2.1, which uses smaller DOAS units serving smaller building areas. In addition, it seems best to focus on providing ventilation control in select high-ventilation space types.

Measure B

This measure refers to a code table that has not yet been created, requires multiple criteria that add significant complexity to achieving compliance, and will be open to misinterpretation by local code officials. It appears to add great complexity and cost to the consumer with little actual value. It may be best to leave this out of the code.

Measure C

This measure allows the ducting of DOAS OSA to the fan coil unit (FCU) return air inlet. This reduces costs as each space served by an FCU does not need an OSA duct and diffuser. To properly provide OSA to the zone(s), the FCU fan would need to run continuously, increasing fan energy use throughout the building at all FCUs. This measure should be called the "Nondedicated Dedicated Outdoor Air System". The value in the DOAS system is the reduction of fan energy by cycling heating and cooling devices' fans off when not heating or cooling. The option would increase energy use by running the fans FCU continuously, thereby defeating the energy-saving feature of a DOAS system. This measure seems out of place in this proposal and should be removed.

Measure D

This measure requires the DOAS system to actively monitor the building's cooling and heating systems and integrate DOAS discharge air temperatures to meet that need, with a low of 55°F in cooling, which is currently set to 60°F in code. Previous research on California DOAS installations recommends neutral air delivery in the 65°F to 70°F range with active mechanical conditioning. When VRF coils in DOAS units or DX coils need to produce 55°F air, their efficiency decreases. It is best to let the zone HVAC system handle design day loads, not the ventilation DOAS system. While I understand the conceptual idea behind this measure by the CASE team, research on DOAS best practices and efficient operation does not support it. I would recommend removing this measure.

Thank you for considering these comments.



Louis Starr, P.E.