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

Additional submitted attachment is included below.

TO: California Energy Commission, Building Energy Efficiency Standards Division

RE: Comment on 2028 Title 24, Part 6 Draft CASE Report: HVAC Air Distribution, Section 3 (Modulating DOAS)

DOCKET: 25-BSTD-03

FROM: Andrew Reilman PE, ASHRAE HBDP, CEO-Principal – Linkage Engineers Inc., Culver City CA, April 27, 2026

I am a mechanical engineer with 25 years of experience designing and specifying DOAS systems in California. I am submitting these comments to oppose several elements of the 2028 Modulating DOAS measure and to raise concern about the broader implications of this proposal for how DOAS is understood and defined in code.

The core concern: these proposals misrepresent what DOAS is

DOAS is a dedicated ventilation system. It delivers 100 percent outdoor air, manages latent loads through heat recovery or a minimal DX coil where needed, and supplies near-neutral air to the zone so the decoupled conditioning equipment does not have to compensate. The zone fan coil or VRF unit handles sensible conditioning and can cycle fully off when there is no load. That is the efficiency mechanism. That is why DOAS enables more efficient zone equipment than mixed air. That is what DOAS designers design for.

The 2028 proposals pull in the opposite direction on all three fronts. Submeasure A adds per-zone modulating controls that mirror VAV terminal box requirements. Submeasure C routes ventilation into the fan coil return air path, coupling the systems DOAS is designed to decouple. Submeasure D mandates 55 degree F supply air, putting the DOAS unit in the role of primary sensible cooling device. Together, these proposals describe a low-flow recirculating mixed air system with outdoor air, not a dedicated outdoor air system.

I have designed DOAS systems in California and elsewhere. The supply air temperatures I specify are a neutral temperature of 65-70 degF. The way I achieve ventilation zone control is through low-pressure constant volume valves or simple shut-off boxes. The energy benefit I observe comes from reduced fan power of the DOAS and FCUs and lower lift of neutral air delivery. These proposals do not reflect how these systems work in practice.

The report characterizes designer practice without evidence

The CASE report states that designers 'typically' specify DOAS without modulating controls, that most designers interpret DCV and occupied standby as not applying to DOAS, and that the constant volume approach is favored because it is 'cheaper and simpler.' No citation is provided for any of these claims. No survey, no compliance form analysis, no enforcement record.

These characterizations do not match my experience. DCV is implemented with single duct VAV boxes where applicable. If these claims are being used to justify a mandatory hardware requirement, they need a factual basis.

Submeasure A: Per-Zone Air Valves

The mandatory requirement for pressure-independent air valves with airflow monitoring stations at every zone is a significant hardware mandate. The energy savings model uses a workaround because the compliance software cannot simulate the proposed system directly. The fan power baseline in the model may not reflect the HRV-DOAS systems that dominate California new construction in dry climates. Field research at California DOAS sites found per-zone DCV on DOAS was not cost-effective.

Washington State Energy Code Section C403.2.1 achieves the same ventilation control objective through a ventilation isolation area requirement: a maximum of 25,000 square feet per floor with an exception for fan systems at or below 5,000 cfm. Buildings that use multiple smaller DOAS units each serving a separate building area comply without per-zone air valve hardware. This approach has been in Washington State code since 2018 with no reported implementation problems. California should adopt a comparable approach rather than a per-zone hardware mandate.

Submeasure C: FCU Return Air Inlet Delivery

When a FCU fan cycles off, ventilation air delivered to the return air inlet of that fan coil has no reliable path to the occupied zone. The zone has to keep its fan running to distribute ventilation air, which defeats the primary energy benefit of decoupled DOAS design. This option should not be added as a prescriptive compliance pathway. The current approach of direct-to-zone or discharge delivery should be retained.

Submeasure D: 55 Degrees F Supply Air Temperature

DOAS in California is sized for ventilation, not primary cooling. The efficiency benefit comes from letting zone heat pumps handle sensible loads at elevated suction temperatures and high part-load COP. Delivering 55 degree F supply air from the DOAS unit moves cooling from the zone equipment to the DOAS DX coil, requires mechanical cooling across a much wider range of California ambient conditions, and creates a heating penalty in zones not calling for cooling.

The proposed limit is drawn from ASHRAE research conducted for humid climate applications and is not supported by California field data. Research on California DOAS installations recommends neutral supply air delivery in the 65 to 70 degree F range for systems with active mechanical conditioning. The current 60 degree F limit reflects sound California practice and should be retained. The proposed 75 degree F lower bound in heating mode would require mechanical heating during conditions where passive heat recovery delivers neutral air without any energy input.

Request

I request that the CEC require the CASE Team to:

1. Withdraw Submeasure C and Submeasure D.

2. Replace Submeasure A with a ventilation isolation area requirement modeled on WSEC C403.2.1, and conduct a comparative cost-effectiveness analysis before any mandatory requirement is adopted.
3. Revise Submeasure B to retain the area-dependent occupancy sensor trigger condition.
4. Formally address, in its response to comments, the PG&E-funded California field research on DOAS controls cost-effectiveness that was not cited in the draft.

Andrew Reilman PE

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