



TITLE 24, PART 6

2025 CODE CYCLE



Residential IAQ: System Accessibility and Fault Indicator Display (FID) Requirements

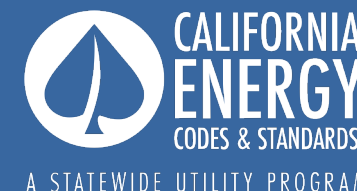


Codes and Standards Enhancement (CASE) Proposal
Single-Family and Multifamily Envelope and HVAC



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Utility Sponsored Stakeholder Meeting, Round 2
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A STATEWIDE UTILITY PROGRAM

Agenda

Recap on Entire Proposed Measure

Current Requirements for IAQ System Accessibility and FID

Overview of Code Change Proposal for IAQ System Accessibility and FID

Justification and Market Overview

Cost and Energy Impacts

Verification

Discussion

Reminder that today's presentation will just focus on the IAQ System Accessibility and FID requirements.



Code Change Proposal

- Recap on Entire Proposed Measure
- Current Requirements for IAQ System Accessibility and FID
- Proposed Requirements for IAQ System Accessibility and FID

Recap on Entire Proposed Code Change

For multifamily dwelling units:

- Mandatory requirement: New construction multifamily units must have balanced or supply-only ventilation, and meet a compartmentalization requirement of ≤ 0.3 cfm50/sf
 - **Change:** Went from "or" to "and". Also allowing supply-only ventilation (not just balanced)
- Prescriptive HRV Requirement: New construction multifamily units in Climate Zones 1, 2, 4, 11-14, and 16 must use balanced ventilation with heat or energy recovery ventilator (H/ERV).
 - **Change:** Went from "Use H/ERV if using balanced ventilation" to "Use H/ERV".
 - **Change:** Climate Zone 4 added, Climate Zone 15 dropped from requirement



To discuss today: Proposed for **single-family and multifamily units**, for balanced and supply-only ventilation (no impact to exhaust-only):



- Mandatory: IAQ filter must be accessible
- Mandatory in Single-Family and Prescriptive in Multifamily: IAQ outdoor air intake must be accessible
- Prescriptive: IAQ system must have Fault Indicator Display (FID)
 - **Change:** Went from ACM requirements to mandatory or prescriptive requirements

Summary of Current Requirements for IAQ System Accessibility and FID

- No mandatory or prescriptive requirements for IAQ system accessibility or FID
- Current ACM requires both, in single-family and multifamily units
- Projects not meeting either requirement are penalized in performance path

Requirement	Penalty if Not Met	Impacts if balanced ventilation (No HRV)	Impacts if HRV
IAQ System Accessibility	CBECC "neutralizes" compliance credit for ventilation system	CBECC assumes standard efficacy for ventilation fan -> No energy savings for higher efficacy fan	CBECC assumes standard HRV Sensible Recovery Efficiency (SRE) -> No energy savings for higher SRE
FID	Ventilation fan penalty and HRV SRE de-rating	CBECC assumes 10% higher ventilation fan energy than standard design	CBECC assumes 10% lower HRV SRE than standard design

Proposed Code Change for IAQ System Accessibility and FID

Proposed for both single-family and multifamily dwelling units:

- Mandatory: IAQ filter must be accessible
 - Unobstructed access shall be provided for servicing supply air filters, which shall be located in accessible mechanical equipment or behind access panels or grilles.
- Mandatory in Single-Family / Prescriptive in Multifamily: IAQ outdoor air intake must be accessible
 - Outdoor intakes shall be located at exterior walls, soffits, gable ends, or roofs. To provide access for cleaning, air intakes shall be located ≤ 12 feet above a walking surface or ≤ 24 inches from a window opening.
- Prescriptive: IAQ system must have Fault Indicator Display (FID)
 - All balanced and supply ventilation systems serving individual dwelling units shall have a Fault Indicator Display (FID) that meets the requirements of Reference Appendix JA15.
- Proposed requirements follow current ACM requirements
 - Requirements for outdoor air (OA) intakes have been revised to allow more flexibility
 - FID requirements are the same as current ACM requirements
- Same proposed penalties for not meeting requirements as current ACM penalties: No compliance credit if OA intake not accessible (multifamily). Fan energy penalty and HRV SRE de-rating if no FID.

Why is the Outdoor Air (OA) Intake Requirement Proposed to be Mandatory in Single-family and Prescriptive for MF?

- OA Intake proposed requirement:
 - Outdoor intakes shall be located at exterior walls, soffits, gable ends, or roofs. To provide access for cleaning, air intakes shall be located ≤ 12 feet above a walking surface or ≤ 24 inches from a window opening.
- Single family homes should be able to easily meet requirement
- More flexibility is needed for multifamily (MF)
 - Hard for OA intakes to be ≤ 12 feet above a walking surface unless upper units have balconies
 - MF designers already struggle to meet OA intake requirements to maintain minimum separation from exhaust terminations with limited wall space
 - MF property owners could use other methods to maintain OA intakes, such as periodically renting scaffolding



Proposed Criteria for FID: Same* as Current ACM

Proposed FID requirements in JA (summarized):

- **JA 15.2: Fault Indication Categories:** FIDs shall respond to the following categories:
 - (a) Filter check or maintenance, either based on performance or a predetermined schedule.
 - (b) Low supply airflow.
 - (c) Low exhaust airflow (balanced systems only) .
 - (d) Sensor failure.
- **JA 15.3 Fault Indicator Means:** Fault indication shall use one or more of the following means:
 - (a) A visual display that is readily accessible to occupants of the dwelling unit.
 - (b) An electronic application.
 - (c) An audible alarm accompanied by a visual display.
- **JA15.4 Instrumentation and Reporting:** Instrumentation shall measure and report the following:
 - (a) Airflow is \geq airflow rated at the Maximum Rated SRE listed in HVI Publication 911 or other approved listing.
 - (b) Fan power is \leq power rating at the Maximum Rated SRE listed in HVI Publication 911 or other approved listing.
- **JA 15.5 Manufacturer Certification:** To qualify, manufactures must certify to the CEC that FID systems meet the requirements of JA15.2 – JA15.5.

*Current ACM language for JA15.3(a) also requires display to be within 1 foot of the IAQ System Control

Poll

What comments do you have on the proposed requirements for IAQ System Accessibility and FID?

Open-ended Poll.

After slide - Proposed Criteria for FID

Filter accessibility language

1. Draft CASE Report lists out permissible locations for IAQ filter

- Unobstructed access shall be provided for servicing supply air filters, which shall be located in conditioned space, unconditioned basements, balconies, mechanical closets, accessible attics, or accessible rooftops, or shall be serviceable from access panels located ≤ 12 feet above a walking surface.
- Pros: More specific. Easier to ensure requirement is met for project teams and building officials
- Cons: Wordy. May not capture all accessible locations.

2. Proposed language is more flexible:

- Unobstructed access shall be provided for servicing supply air filters, which shall be located in accessible mechanical equipment or behind access panels or grilles.
 - Pros: Shorter, provides more flexibility
 - Con: May require some interpretation that location meets definition of unobstructed access or accessible
- Statewide CASE Team proposes the more flexible version (#2), but the CEC may wish to use list approach (#1) for greater enforceability.
 - **If list approach is used (#1), are there any additional locations for filter access we should add?**

Poll

Are there other accessible filter locations besides conditioned space, basement, balcony, mechanical closet, attic, roof, or ≤ 12 ft above walking surface?

Open-Ended Poll

After slide: Alternative filter access language



Justification and Market Overview

- Purpose of Requirements
- Availability of Products and Feasibility

Justification for IAQ System Accessibility and FIDs

- Field studies show that many ventilation systems of all types are not operational (not turned on), or deliver less air than code requirements. Poor maintenance could contribute to this.

Study	No. of tested sites	Ventilation System Issues Found	Ventilation system	No. of test sites	Measured performance compared to expected
Martin (2020) W.R. Chan (2020)	70 (CA)	Dirty filters (47 of 128 filters)	Exhaust system	64	74% of systems not operating
			Central fan integrated (CFI) HVAC	6	
	25 (SE U.S.)	Dirty filters (8%)	ERV	6	48% of systems not operating
			Exhaust System	4	
			CFI HVAC	15	
	55 (West)	Damper issues (10%)	ERV/HRV	7	36% of systems not operating
			Exhaust System	22	
			CFI HVAC	25	
Hill (1998)	69 (Ottawa)	Broken supply motor (3%), Dirty filters (34%), blocked air intake (14%)	HRV	69	6% not operating, 39% have 10-56% less airflow than code requirement
Sonne (2015)	21 (FL)	Dirty filters/dirty outdoor air intake (2 of 6), low airflow (4 of 6)	ERV	6	86% had 16-80% airflow deficit compared to expected flow (based on system type)
		Low airflow (14 of 15)	Scheduled ventilation	15	
Lubliner (2002)	31 (WA)	Mechanical dampers not functional (18%), Occupant disabled timers (10%)	Exhaust System with Inlet Vents	14	48% did not meet code requirement
			Passive Integrated Exhaust System, CFI HVAC	11	
			CFI HVAC	6	

Market Overview and Technical Feasibility

- **Fault Indicator Displays (FID):** Connect to the ventilation systems
 - Indicate filter issue or low airflow, and inform users through display or alarm
 - Certified Products: 28 products by 3 manufacturers in CEC database¹
- ⇒ **Feasibility: Products are available, and FIDs are already specified in ACM for projects using performance path**
- **IAQ Filter Accessibility**
 - IAQ Filters may be located in many areas, including accessible mechanical equipment or serviceable from access panels.
- ⇒ **Feasibility: Proposed locations for IAQ filter should include all accessible areas where designers are currently locating them.**
- **Outdoor Air Intake Accessibility**
 - Outdoor air intakes should be ≤ 12 ft of walking surface or ≤ 2 ft of a window.
- ⇒ **Feasibility: More challenging to meet, but good practice. No penalty if not met, but no compliance credit can be earned for ventilation system.**

FID with touch screen display



¹California Energy Commission - Residential Fault indicator display certification list - (<https://www.energy.ca.gov/media/7020>)

Costs and Energy Impacts

Methodology and Assumptions



Cost Assumptions and Impacts

- IAQ System Accessibility Requirements:
 - Achieved through correctly locating equipment
 - Assume no increase in costs
- FID Requirements
 - Added for balanced or supply-only ventilation, in base case and proposed case
 - Material: \$172 (based on two HVAC suppliers) per dwelling unit
 - Labor: 0.25 hours, or \$22, for purchasing and installing per dwelling unit

Total FID Cost: \$194

Energy Assumptions and Impacts

- IAQ System Accessibility Requirements:
 - Users can uncheck box in CBECC: No savings are available from improved IAQ fan efficacy or from higher HRV SRE
- FID Requirements
 - Users can uncheck FID box in CBECC. Projects receive 10% penalty in fan efficacy and (if applicable) 10% reduction to HRV SRE

Energy Impacts of No FID: Scenarios for Midrise Project

Scenario	FID	LSC (%) savings compared to Base Case CZ 3	LSC (%) savings compared to Base Case CZ 12
Base Case: Includes FID	Yes	--	--
No FID	No	-0.6%	-0.6%

Verification

Methodology and Assumptions



Method for Verifying IAQ System Accessibility and FID

- IAQ System Accessibility Requirements:
 - **Mechanical designer** and **architect** locate equipment
 - **Plans examiner** confirms access of the equipment
 - **Mechanical contractor** installs equipment per plans to ensure access
 - **Inspector** verifies unobstructed access of the equipment
- FID Requirements
 - **Mechanical designer** specifies a ventilation system with FID from the certified list and indicates on compliance forms
 - **Plans examiner** confirms the presence of FID, and that FID is on the CEC's certified list
 - **Mechanical contractor** installs FID
 - **HERS Rater (or ATT)** confirms the presence of FID

Link to Certified List of FIDs on CEC Website:

<https://www.energy.ca.gov/media/7020>



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[Residential Fault Indicator Display Certification List ADA.xlsx](#)



Discussion and Next Steps

We want to hear from you!

- Additional information, including the Round 1 meeting slides, are on [Title24stakeholders.com](https://title24stakeholders.com)
- Provide **any last comments or feedback** on this presentation now verbally or over the GoTo Webinar Questions Pane
- More information on pre-rulemaking for the 2025 Energy Code at <https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2025-building-energy-efficiency>

Comments on this measure are due by May 30, 2023. Please send comments to info@title24stakeholders.com and copy CASE Authors (see contact info on following slide).

Thank You

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