DOCKETED	
Docket Number:	25-BSTD-03
Project Title:	2028 Energy Code Pre-Rulemaking.
TN #:	273366
Document Title:	Western States Council and SMART Sheet Metal Workers Local 104 Comments - Western States Council and Local 104 MERV 13 Proposal to Remove Ten Foot Duct Length Exclusions
Description:	N/A
Filer:	System
Organization:	Western States Council and SMART Sheet Metal Workers Local 104
Submitter Role:	Public
Submission Date:	11/4/2026 3:21:44 PM
Docketed Date:	11/4/2026

Comment Received From: Western States Council and SMART Sheet Metal Workers Local 104
Submitted On: 11/4/2026
Docket Number: 25-BSTD-03

Western States Council and Local 104 MERV 13 Proposal to Remove Ten Foot Duct Length Exclusions

Western States Council and SMART Sheet Metal Workers Local 104 respectfully submit the attached proposal to remove the ten-foot duct-length exclusions in Sections 120.1(c)1A.i and 150.0(m)12A.i and their 2028 draft counterparts. The proposal addresses newly installed HVAC equipment under applicable project requirements, retaining MERV 13 or the permitted equivalent for both outdoor and recirculated air. Supporting evidence addresses indoor air quality, equipment compatibility, and energy impacts. We request coordinated agency review and guidance on residential adoption timing under AB 130, regarding 150.0(m)12A.i . Thank you for considering our proposal.

Additional submitted attachment is included below.

2028 California Energy Code

Measure Proposal to the California Energy Commission

Remove the Ten Foot Duct Length Exclusion from Air Filtration Requirements

Measure categories: Nonresidential and Single Family Residential HVAC

Submitted jointly by

Western States Council
SMART Sheet Metal Workers Local 104

November 4, 2026

Docket 25-BSTD-03
2028 Energy Code Pre-Rulemaking

Authors and contacts

Christopher Ruch
Codes and Standards Representative
SMART Sheet Metal Workers Local 104

4040 Lennane Drive
Sacramento, CA 95834
chrisr@smw104.org | (916) 280-6281

Jeremy Zeedyk
Grant Administrator/Special Projects Coordinator
Western States Council
4040 Lennane Drive
Sacramento, CA 95834
Cell: 860-209-4324 | jeremy@wscsmw.org

Requested action

Delete the 10-foot duct-length limitations in Sections 120.1(c)1A.i and 150.0(m)12A.i, and their 2028 draft counterparts. Cover newly installed HVAC equipment in nonresidential and single-family projects, including applicable additions and replacements. Retain filtration of both outdoor and recirculated air and the existing performance and installation requirements. The change creates no blanket retrofit of equipment already in service.

CONTENTS

Executive Summary....3
Acronyms....4
1 Introduction....5
2 Measure Description....7
3 Market and Economic Analysis....12
4 Cost-effectiveness....15
5 Statewide Impacts....18
6 Proposed Code Language....19
7 References....21
Appendix A Docket Coordination....25
Appendix B Technical Calculations....26
Appendix C Source Exhibit Index....28

EXECUTIVE SUMMARY

Western States Council and SMART Sheet Metal Workers Local 104 recommend deleting the 10-foot duct-length exclusions in the 2028 California Energy Code counterparts of Sections 120.1(c)1A.i and 150.0(m)12A.i. The recommendation now covers nonresidential and single-family HVAC. Duct length does not determine exposure to fine particles or occupant-generated respiratory aerosols. Retain MERV 13 or the existing permitted equivalent, both-air-stream filtration, sizing, sealing, and labeling. [1, 2]

The primary justification is protection from PM2.5 and indoor-generated respiratory aerosols. An outdoor-air intake filter cannot capture particles generated indoors; recirculated-air filtration must also be addressed. Outdoor-air ventilation still provides dilution. Selected VRF cassette options demonstrate technical feasibility, subject to complete configuration and occupancy-specific verification. [8-11, 36, 38]

The proposal covers new construction and newly installed equipment where existing additions and alterations provisions require compliance. It creates no blanket existing-equipment retrofit. Separate school duties under Education Code §17661(c), including feasibility provisions, continue. [1, 2, 41]

ASHRAE 62.2 directly relates to the single-family proposal: Section 150.0(o)1D substitutes California's Section 150.0(m)12 for the ASHRAE filtration rules. Proposed Addendum y would phase out 62.2's duct-length trigger, with a transition until January 1, 2029. It concerns MERV 11; this proposal retains MERV 13. A historical connection to nonresidential Section 120.1(c) remains plausible. Section 2.2 addresses timing and multifamily coordination. [1, 2, 33-35, 44]

Table 1. Proposal summary and evidence status

Item	Recommendation or finding
Scope	Nonresidential and single-family new construction and applicable additions or alterations. No blanket retrofit. Review the draft multifamily cross-reference with CEC.
Core amendment	Remove the qualifiers in §§120.1(c)1A.i and 150.0(m)12A.i and their draft counterparts; align repeated draft sizing and labeling language.
Technical evidence	Selected Carrier, Samsung, and Daikin cassette options; airflow and pressure data. Confirm suitability and costs separately for residential applications.
Energy and cost findings	WCEC classroom modeling and transparent fan-energy sensitivity calculations inform review. No statewide energy saving or approved benefit-cost ratio is claimed.
Implementation	Verify both air paths, filter dimensions, rated pressure drop, airflow, fan settings, access, and the applicable acceptance or residential verification process.
Related proceedings	ASHRAE 62.2 Addendum y; CALGreen and Mechanical Code coordination; residential adoption timing and draft cross-references.

Validate model-specific performance, installed costs, and lifecycle economics for each occupancy. The calculations are screening examples rather than a final adoption finding.

ACRONYMS

Table 2. Acronyms used in this proposal

Term	Meaning
ACM	Alternative Calculation Method
AHJ	Authority Having Jurisdiction
ATT	Acceptance Test Technician
BCR	Benefit-Cost Ratio
BSC / CBSC	California Building Standards Commission
CASE	Codes and Standards Enhancement
CEC	California Energy Commission
CMC	California Mechanical Code
DOAS	Dedicated Outdoor Air System
DSA	Division of the State Architect
ECA	Equivalent clean airflow
HVAC	Heating, Ventilating, and Air Conditioning
IAQ	Indoor Air Quality
LSC	Long-term System Cost
MCA	Minimum Circuit Ampacity
MERV-A	Minimum efficiency reporting value based on ASHRAE 52.2 Appendix J conditioned-media testing
MERV	Minimum Efficiency Reporting Value
NAFA	National Air Filtration Association
PM2.5	Fine particulate matter with an aerodynamic diameter of 2.5 micrometers or smaller
TAB	Testing, Adjusting, and Balancing
UMC	Uniform Mechanical Code
VCHP	Variable-capacity heat pump
VRF	Variable Refrigerant Flow
WCEC	UC Davis Western Cooling Efficiency Center
WSC	Western States Council

1 INTRODUCTION

The requested change replaces duct length as an applicability proxy with a consistent filtration expectation for the covered air-supplying systems. A room does not lose its need for particle protection when the supply duct is shortened to 10 feet or eliminated. The amendment would let designers choose refrigerant-based heat transfer, VRF, packaged systems, or other approaches while selecting and commissioning an air-filtration configuration that satisfies the applicable requirements.

EPA identifies acute and chronic fine-particle exposure as a cause of cardiovascular harm and a likely cause of important respiratory effects. Children, older adults, and people with heart or lung disease are among the populations at increased risk. These findings support attention to routine exposure as well as wildfire episodes. They do not establish a numerical health benefit for this particular code amendment. [12]

CEC-sponsored work by UC Davis and Lawrence Berkeley National Laboratory reported that MERV 13 filters could reduce indoor particulate exposure by 40 percent or more relative to MERV 8 in the evaluated California classroom scenarios. The same project identified an efficient HVAC package incorporating multiple technologies. Its reported package energy savings must not be attributed to a filter substitution alone or assumed to represent ductless VRF performance. [13]

The same filtration principle applies in single-family homes: ambient particles can enter through ventilation or infiltration, while occupants and indoor activities generate particles inside. Removing the parallel limitation in Section 150.0(m)12A.i supports selecting new residential equipment that filters recirculated room air as well as incoming outdoor air. The amendment preserves the existing residential filter rating, pressure limits, service access, and ventilation obligations. [1, 12, 18]

Filtration of recirculated air protects against indoor-generated aerosols

ASHRAE Standard 241, Control of Infectious Aerosols, assigns MERV-A 13 filtration a 77% default infectious-aerosol removal efficiency for its equivalent clean airflow calculation. MERV 8 receives no credit in that calculation. Zero credit does not mean that a MERV 8 filter captures no particles. The 77% value is a standard calculation input for infectious aerosols, not a universal PM2.5 efficiency or an infection-risk reduction percentage. [36, 38]

Filtering outdoor air and filtering recirculated air serve complementary purposes. An outdoor-air intake filter treats particles entering through that intake; it does not capture respiratory aerosols generated by people after the air enters the room. Outdoor-air ventilation still dilutes those indoor emissions. Recirculating room air through effective filtration adds particle removal, including where a separate ventilation system serves ductless heating and cooling terminals. This distinction matters in occupied classrooms, gyms, restaurants, and meeting rooms. [36, 38]

Illustrative equivalent clean airflow calculation

Assume a well-mixed room with 1,000 cfm of delivered supply airflow: 300 cfm outdoor air and 700 cfm recirculated air. Assume the outdoor air contains none of the target indoor-generated aerosol, no filter bypass, and the ASHRAE 241 MERV-A 13 calculation value of 0.77. The contributions are: [36, 38, 39] This is an airflow illustration, not a typical singlefamily design or a residential performance estimate.

Contribution	Calculation	Equivalent clean airflow
Outdoor-air ventilation	300 cfm × 1.00	300 cfm
Filtration of recirculated air	700 cfm × 0.77	539 cfm
Combined contribution	300 + 539	839 cfm

Here, recirculated-air filtration contributes about 1.8 times the equivalent clean airflow supplied by outdoor-air ventilation alone. An intake-only filter would not provide that additional 539 cfm for particles generated indoors. These figures illustrate particle-removal capacity, not a compliance target or a predicted percentage reduction in infections. [36, 38]

MERV-A reflects conditioned-media testing under ASHRAE 52.2 Appendix J. The 241 example does not give every product labeled MERV 13 an automatic 77% credit. This proposal retains the Energy Code's existing MERV 13 or permitted equivalent requirement; it does not add MERV-A certification or an ASHRAE 241 clean-airflow target to the mandatory redline. [1, 2, 36, 38]

WCEC's classroom study also supports evaluating filtration within the HVAC system rather than assuming MERV 13 imposes a large energy penalty. Section 4.2 summarizes the modeled comparison. [37]

The UC Davis Western Cooling Efficiency Center's (WCEC) school guidance recommends testing and adjusting HVAC systems, maintaining ventilation operation, using MERV 13 or better where feasible, and maintaining filters. These lessons support treating filtration, delivered ventilation, controls, and maintenance as a coordinated system. CO2 monitoring can help assess ventilation conditions over time; it does not measure infectious aerosol exposure or verify particle removal. Ventilation and filtration performance therefore need their own verification. [14, 36, 38]

The proposed change is a substantive expansion of the Part 6 applicability language, not merely an editorial renumbering. The economic review should distinguish the Energy Code baseline from obligations that may already apply under Parts 4 and 11. **Neither a blanket zero cost assumption nor a claim that all affected equipment requires replacement is supported by the evidence assembled here.**

2 MEASURE DESCRIPTION

Amend both air-filtration applicability provisions: Section 120.1(c)1A.i for its existing nonresidential scope and Section 150.0(m)12A.i for single-family residential buildings. Include ductless and short-duct HVAC installed in new construction and in additions or alterations when existing compliance triggers apply. Keep the surrounding filtration, ventilation, and performance rules. The proposal does not create a separate retrofit trigger for equipment already in service. [1, 2]

2.1 Measure Modifications to Energy Code Documents

2.1.1 Energy Code Change Summary

Section 120.1(c)1A.i maps to draft Section 401.2.1.1.1, item 1; Section 150.0(m)12A.i maps to draft Section 402.2.6.12, item 1. Delete the duct-length phrase from each. The draft also repeats it in residential filter sizing and product labeling; make the matching deletions shown in Section 6.1. **Retain the other outdoor-air system categories, existing exceptions, filter rating, and sizing and pressure limits.** [1, 2]

2.1.2 Reference Appendices Change Summary

No appendix express-terms amendment is proposed here. Review the nonresidential acceptance procedures and residential verification procedures, including RA3.1.4.5, RA3.1.4.7, RA3.1.4.8, and applicable variable-capacity heat-pump procedures. Some current provisions expressly address ducted systems; CEC should identify any additional procedure needed to verify newly covered ductless equipment and publish it through the rulemaking. **Preserve existing test responsibilities unless expressly amended.** [42]

2.1.3 Compliance Manuals Change Summary

Update both nonresidential and single-family compliance guidance. Show separate outdoor-air and room-recirculation paths for a ductless terminal paired with a DOAS or residential supply/balanced ventilation system, a cassette with an approved filter assembly, and a short-duct unit. **Explain nominal filter depth, face velocity, clean-filter pressure limits, sealing, settings, access, maintenance, and applicable project triggers.** [1, 43]

2.1.4 ACM Reference Manuals Change Summary

Review both nonresidential and residential models for terminal and ventilation fans, filter pressure loss, fan schedules, loading, and controls. Account for heating or cooling fan cycling when estimating recirculated-air cleaning; the redline does not impose continuous terminal-fan operation. **Validate any modeling change before assigning an energy credit. Retain required outdoor-air ventilation.**

2.1.5 Compliance Forms Change Summary

Coordinate the applicable nonresidential forms and residential Certificates of Compliance, Installation, and Verification. Identify each unit/filter combination, design airflow, sizing path, rated clean-filter pressure drop, fan settings, air paths, measured airflow where required, and service instructions. **Use the existing verification program; do not automatically impose an unadopted test or new credential on every ductless unit.** [42]

2.2 Measure Context

2.2.1 Comparable Model Code or Standard

The supplied UMC comparison identifies broad MERV 13 language in Section 311.2.1 in the 2024 and 2027 editions. Current California Mechanical Code Sections 311.2.1 and 401.3 contain filtration provisions without the Energy Code's 10-foot qualifier. Applicability, AHJ authority, agency adoption, and exceptions must be evaluated for the particular project. These provisions support coordinated review; they are not a substitute for resolving the Part 6 scope explicitly. [4, 5]

ASHRAE 62.2 history and proposed removal

ASHRAE 62.2 is the residential ventilation and IAQ standard directly connected to California's single-family framework. Section 150.0(o)1D requires Section 150.0(m)12 in place of 62.2 Sections 6.7 and 6.7.1. The 10-foot trigger in 62.2's filtration language is therefore a direct comparison for the proposed Section 150.0(m)12A.i deletion. The 2011 supplement shows it with MERV 6; approved Addendum m to 62.2-2022 retains it while increasing filtration to MERV 11. Its relationship to Section 120.1(c) is a historical inference for CEC to confirm. Neither history establishes an engineering boundary at 10 feet. [1, 21, 34, 35]

Proposed Addendum y to Standard 62.2-2025 moves in the opposite direction from extending the exclusion into more California code provisions. Its first public-review draft deletes the permanent duct-length qualifier. The foreword explains that filtration should protect equipment cleanliness and indoor air quality whether or not the heating or cooling equipment has ductwork. This is evidence of an ASHRAE committee proposal to walk back the longstanding exclusion and supports California reassessing its continued technical basis. [33]

Proposed Exception 2 temporarily exempts systems with less than 10 feet of ductwork until January 1, 2029. The foreword describes this as time for mini-split heat-pump manufacturers to redesign systems where necessary. Yet the accompanying Carrier, Samsung, and Daikin documents already identify MERV 13 cassette options, and a public retailer offers the Daikin kit. The CEC should evaluate this existing market evidence before assuming the entire equipment category requires future redesign or a blanket deferral. Any transition should respond to documented gaps in specific configurations. [8-11, 19, 33]

Proposed Addendum y directly informs the residential recommendation by removing the filtration trigger based on duct length in Standard 62.2. It is more than historical background for nonresidential Section 120.1(c). The supplied first public-review draft addresses MERV 11; this California proposal retains MERV 13 or its existing permitted equivalent. Because California specifies its own filtration requirements through Section 150.0(m)12, adoption of an

ASHRAE addendum would not itself amend the state code. An explicit California amendment is needed. The public-review draft is not an adopted requirement or an ASHRAE endorsement. [1, 33]

ASHRAE's education-facilities guidance recommends assessing equipment capability, using the highest practical filtration level with MERV 13 as the recommended minimum, checking airflow after upgrades, and maintaining the equipment. NAFA supports higher-efficiency filtration while emphasizing correct filter holding assemblies, sealing, and design-stage accommodation of pressure loss. These sources are technical guidance; neither organization is identified as endorsing this specific proposal. [15, 16]

Single family scope and filtration design

Section 150.0 is in Subchapter 7, Single-Family Residential Buildings—Mandatory Features and Devices. Subsection (m)12A.i currently limits covered space-conditioning systems to those with more than 10 feet of ductwork. Removing that qualifier applies the existing requirements in Subsections B–E to the newly covered equipment. For newly constructed homes, select compliant equipment at design; for existing homes, apply the project triggers in Section 150.2 rather than assume that every existing unit must be replaced. [1]

For example, a new ductless heat pump paired with a separate filtered outdoor-air supply needs a complying recirculated-air filtration path at the terminal as well. Filtering only the ventilation supply cannot capture particles emitted within the home. A short-duct mixed-air unit may use a common upstream filter if both air streams pass through it. A room air cleaner can supplement exposure control, but this proposal does not create an alternative to the existing upstream-filtration requirement. [1]

Retain Section 150.0(m)12's design pathways: nominal two-inch minimum filters sized by the designer, or nominal one-inch minimum filters sized at no more than 150 fpm face velocity and limited to 0.1 inch water clean-filter pressure drop at design airflow. Also retain filter-location, labeling, access, bypass, and applicable fan-performance provisions. Do not infer compliance from a MERV label alone. [1]

2.2.2 Conflicts with Other Regulations or Certifications

The original October 29 BSC workshop item 3d proposed adding the Energy Code's duct-length qualifier to CALGreen. In a subsequent update, BSC staff stated that it would retain the main paragraph and instead propose an exception for a ductless mini-split system unable to accommodate MERV 13. The original exhibit is retained as workshop history, not as the current BSC position. These are proposals, not adopted requirements. [6, 40]

DSA item 4m would remove DSA applicability from CALGreen's filtration section as duplicative of Parts 4 and 6. Relying on a narrower Part 6 scope can reduce protection where no independent broader requirement applies; applicable Part 4 requirements remain in effect. Extending an equipment or duct-length exception into Part 4 would further narrow coverage. We request coordinated alignment that preserves filtration of both air paths, informed by the proposed ASHRAE 62.2 phaseout and current equipment evidence. [5-7, 33, 40]

Education Code §17661 separately addresses existing school HVAC. Subdivision (c) requires covered schools to install MERV 13 or higher where the school determines it feasible and appropriate. If an existing system is not designed for that rating, the school must use the highest MERV level it determines feasible without significantly impairing system life or performance. Subdivision (b) separately governs ventilation rates and documentation when existing equipment cannot safely and efficiently meet current rates. Covered schools include districts, county offices, charter and private schools, community colleges, and CSU; UC is requested to comply, with applicability subject to Regents' action. These existing-equipment provisions support addressing equipment limitations without excluding newly selected equipment solely by duct length. [41]

This proposal does not change refrigerant selection, federal appliance-efficiency ratings, product listing requirements, or manufacturer instructions. CEC should evaluate the treatment of federally covered products and approved equipment configurations in developing the final requirements. No claim of a legal preemption determination is made here.

The October 12, 2026 draft Section 403.2.2.2 directs multifamily attached dwelling-unit filtration to Section 402.2.6.12. The proposed single-family deletion could therefore also change those units' filtration scope through that reference. Current Section 160.2(b)1 contains its own parallel provisions. We request CEC review of the shared draft text, occupancy coverage, and resulting multifamily costs and verification needs before adoption. This submission adds no separate redline to current Section 160.2. [1, 2]

CBSC identifies the residential building-standard restrictions enacted by AB 130 in Health and Safety Code Section 18930(g). We request CEC confirmation of the lawful adoption path and effective date for the residential component, including whether a statutory exception applies. The ASHRAE public-review draft alone does not establish an exception. If residential timing differs, consider the nonresidential amendment independently and identify the appropriate cycle for the residential recommendation. [44]

The proposed mandatory changes are the duct-length deletions in the two applicability provisions and matching deletions from the repeated residential draft language. No general equipment-class, server-room, or closet exception is proposed. Any further exception should be evaluated separately against use, air paths, occupant protection, and technical evidence.

2.3 Compliance and Enforcement

Table 3. Air-path configurations and evidence needed for compliance

Configuration	Outdoor-air path	Recirculated-air path and required proof
Separate DOAS plus ductless cassette	Filter the ventilation supply under the existing outdoor-air provisions; observe any applicable heat-recovery filter-location exception.	Provide a complying return-air filter assembly upstream of the cassette coil. A filtered DOAS treats incoming outdoor air; it does not filter room air recirculating through the cassette or capture particles generated indoors along that separate path.
Short-duct mixed-air unit	Show whether outdoor air joins the return stream upstream or downstream of the proposed filter.	A common upstream filter may treat both streams only if the drawing proves both pass through it. An outdoor-air connection downstream needs a separately compliant path.

Configuration	Outdoor-air path	Recirculated-air path and required proof
Cassette with an outdoor-air accessory	Document the injection location and any separate ventilation fan and filter.	Demonstrate that all applicable air reaches the required filtration before conditioning. An accessory description alone does not establish the location or absence of bypass.
Supplemental room air cleaner	Does not establish compliance for the ventilation supply.	Useful as a supplement, but not proof that recirculated air passing through an unfiltered HVAC coil meets the existing upstream-filtration rule.

Interpretation of the proposed expanded scope using the surrounding requirements in [1, 2]; no new exception or alternative compliance method is established by this table.

At design, identify both air streams and select a documented unit/filter combination with adequate access, filter area, and fan capability. At installation, confirm the actual accessory, filter rating, nominal size, fit, seals, fan programming, and electrical provisions. At verification, measure outdoor and terminal airflow with the specified filters installed and record true electrical input at the tested operating points. Confirm operation at the manufacturer’s service limit or another accepted loaded-filter criterion without loss of required airflow.

Apply each amended provision through its existing project rules: current Section 141.0 for nonresidential work and Section 150.2 for single-family additions and alterations, with their 2028 counterparts. Section 150.2(b)1C expressly references filtration for entirely new or complete replacement space-conditioning systems; Section 150.2(b)1Diia also addresses complete replacement duct systems. Retaining equipment without a regulated project does not itself trigger this measure. Separate school duties continue. Use the applicable code and approved verification program. [1, 41, 42]

3 MARKET AND ECONOMIC ANALYSIS

3.1 Market Structure and Availability

Public manufacturer literature already identifies MERV 13 options for selected Carrier, Samsung, and Daikin VRF cassettes. Carrier's May 2018 catalog and Samsung's 2019/2021 documents show these offerings predate the proposed January 1, 2029 transition. Daikin supplies model-specific pressure and airflow data, and a public retailer listed its kit for $602.68 on October 29, 2026. Selected MERV 13 solutions therefore already exist in the market. [8-11, 19, 33]

These examples support proceeding with filtration requirements while resolving remaining equipment-specific gaps. Confirm current unit/accessory availability and the complete Part 6 configuration, including filter sizing, sealing, delivered airflow, fan power, and both air paths. One retail listing does not establish every model's stock or lead time. [8-11, 19]

For single-family implementation, obtain current manufacturer confirmation for the actual residential unit capacities and approved filter assemblies, including power, sound, installed clearances, service access, and operating range. The commercial VRF cassette examples demonstrate available filtration technology; they are not a finding that every residential mini-split is compatible or an estimate of residential market share. Obtain residential-specific availability, installed-cost, and maintenance quotations. [8-11]

Table 4. Documented cassette filtration options and limits of the evidence

Manufacturer and equipment	Published evidence	Remaining project verification
Carrier 40VMF four-way cassette; accessory 40VMF002----	Catalog identifies a two-inch MERV 13 filter rack without increasing unit height. The same page lists an optional outdoor-air kit. Printed p. 28 / PDF p. 30. [8]	Obtain the approved filter selection, pressure/airflow data, operating watts with the accessory, loaded-filter capability, and actual outdoor-air routing.
Samsung DVM S four-way cassettes; MF-C6A0	Technical bulletin requires field fan-setting changes and supplies model-specific airflow information. Submittal gives a 20.25 by 20.25 by 1.1875 inch filter. [9, 10]	Verify current model compatibility, nominal-depth classification, any face-velocity pathway, operating watts, sealing, and the required field configuration.
Daikin FXFQ cassette family; DACA-FQP13-1K	Supplied performance sheet lists model-specific airflow and initial pressure drop, a 0.390 inch water final drop, and a 20.50 by 20.50 by 1.50 inch filter. [11]	Actual 1.50-inch depth does not by itself establish the nominal two-inch pathway. Verify nominal classification, face area where applicable, fan capability, and all air paths.

Table 5. Selected Daikin published filter operating points

Cassette model	Airflow cfm	Initial drop in. water	Final drop in. water	Face velocity fpm
FXFQ07TVJU	420	0.060	0.390	144
FXFQ18TVJU	742	0.130	0.390	254
FXFQ30TVJU	1,112	0.220	0.390	381
FXFQ48TVJU	1,218	0.250	0.390	417

Source: [11], p. 1. Face velocities are calculated from the stated 20.50 by 20.50 inch face dimensions, not claimed as manufacturer-rated values. This table is not a finding that every row satisfies the existing filter-sizing provision.

3.2 Design and Construction Practices

Select equipment around required delivered airflow and the full air path rather than attach a restrictive filter after design. Larger filter area, deeper media where permitted, appropriately selected fans, sealed racks, and accessible service locations can address performance concerns. ASHRAE reports that some newer MERV 13 filters have pressure losses similar to older MERV 8 products; that is not a universal relationship. Compare actual products at the same airflow and consider loading. [16-18, 32]

For the nominal one-inch pathway, retain both the maximum 150 fpm face velocity and applicable 0.1 inch water clean-filter pressure limit. At 400 cfm the minimum face area is 2.67 square feet. The Daikin sheet lists a 20.50-by-20.50-inch face and 0.060 inch initial loss at 420 cfm, but its actual 1.50-inch depth requires confirmation of nominal classification. Higher listed flows can exceed the face-velocity or pressure limit. These figures do not establish automatic compliance for either occupancy. [1, 11, 43]

3.3 Impacts on Market Actors

Designers need current combination data; manufacturers and distributors need to document approved configurations and replacement media; installers need time for accessory installation and setup; owners need a service plan; and AHJs need a clear means of verifying the complete air path. Avoid making higher-efficiency filtration dependent on a proprietary controls platform. Preserve technology choice among configurations that demonstrate compliance.

3.4 Impacts on Jobs and Businesses

Implementation would use HVAC design, installation, TAB, acceptance testing where applicable, and maintenance services. WSC and Local 104 offer practical assistance with stakeholder review, training, and field evaluation. No net jobs estimate, wage impact, or small-business impact has been quantified. Include small contractors, public-school facilities staff, manufacturers, community benefit organizations, and academic researchers in the review.

3.5 Economic and Fiscal Impacts

Costs depend on the baseline equipment, filter assembly, installation access, replacement frequency, airflow setting, and whether Part 4 or Part 11 already requires the same filtration on the project. Evaluate public-school operating budgets, smaller commercial occupancies, and local enforcement effort. Do not extrapolate a single accessory price to all covered systems or assume a budget saving without a documented comparison.

3.6 Cost of Compliance and Enforcement

A retailer publicly offered the Daikin-McQuay DACA-FQP131K MERV 13 kit for $602.68 when checked on October 29, 2026. The listing provides an available-to-order market example in addition to the manufacturer documents. This posted hardware price is not an installed price, incremental cost, or assurance of current unit compatibility. Obtain vendor and contractor quotations for the actual design, including tax, freight, markup, access, setup, testing, and service. [19]

Table 6. Illustrative first-cost worksheet for one accessory installation

Component	Input and basis	Illustrative amount
Accessory kit	One posted retail listing; not an equipment quotation. [19]	$602.68
Installation	Assumption: 1.0 labor hour at $120/hour.	$120.00
Setup and airflow verification	Assumption: 0.5 labor hour at $120/hour.	$60.00
Illustrative gross subtotal	Sum of these three entries only; excludes other project costs.	$782.68
Incremental installed cost	Subtract the compliant baseline’s hardware and labor; obtain design-specific quotations.	Not established

The labor rate and hours are analytical assumptions, not surveyed California prices. Do not use this subtotal as a typical installed-cost estimate or an incremental compliance-cost finding.

Evaluate the residential market separately. Compare the compliant new-equipment selection with the equipment and filter assembly that would otherwise be installed. Account for household filter replacement, service access, fan schedules, sound, and the number of indoor terminals per home. The commercial accessory worksheet is not a statewide residential cost estimate.

4 COST-EFFECTIVENESS

4.1 Energy Savings Methodology

No direct energy savings are assumed from deleting the thresholds. At equal delivered airflow, added pressure loss can increase fan electricity. A lower-loss filter may offset that effect, but matched product data must demonstrate it. Model nonresidential and single-family cases separately, including climate, runtime, fan cycling, loading, motor efficiency, and heating/cooling interactions. A reduction in required airflow is not an acceptable energy-saving strategy.

Use two explicitly reported baselines: the CEC-required adopted Energy Code baseline for incremental measure analysis, and a separately documented baseline reflecting applicable Parts 4 and 11 and school-specific statutory duties. Confirm project scoping with the agencies. Do not count already-required filtration as a new cost or assume broader provisions always make this amendment cost-neutral. [41]

For a constant-airflow screening calculation, air power is airflow Q in cubic meters per second multiplied by incremental filter pressure loss in pascals. Divide by overall fan/motor efficiency to estimate electrical input. Use measured watts for the final evaluation; the screening expression does not model a specific fan curve.

$$Incremental\ \ fan\ \ watts\ =\ \frac{Q\ \times\ \Delta p}{\eta}$$

Here, Q = cfm multiplied by 0.00047194745; one inch water = 249.0889 Pa; and eta is an explicitly assumed overall efficiency. Annual incremental kWh equals incremental watts multiplied by operating hours divided by 1,000. Final lifecycle evaluation should use CEC-approved 2028 prototypes, hourly schedules, LSC factors, and the applicable CEC economic method. [3]

4.2 Energy Savings Results

Published classroom modeling and WCEC review

Pistochini, Mande, and Chakraborty (2022) modeled packaged classroom HVAC in 13 U.S. cities. Against a MERV 8 baseline with 7 L/s per person of outdoor air, upgrading to MERV 13 increased annual HVAC electricity by an average 1.5% (city range 0.7–2.7%). Adding separate in-room filtration while retaining MERV 8 increased it by an average 10.7% (range 5.5–41%). [37]

These are classroom simulation results for specified equipment, filters, and schedules; they are not measured VRF performance or predicted savings in single-family homes. Model residential systems separately. A room cleaner may supplement exposure control but does not establish compliance with the existing upstream-filtration rule. [1, 2, 37]

Both comparisons preserve the distinction between filtration and ventilation. Evaluate energy against the same delivered airflow, operating schedule, target particle-removal service, and baseline equipment. A filter that reduces required airflow or a cleaner that operates on a different schedule is not an equivalent comparison.

Table 7. Illustrative annual fan-energy sensitivity at equal delivered airflow

Added loss in. water	Added fan watts	Added kWh/year	Annual bill change
-0.025	-3.92	-7.84	-$2.35
+0.000	+0.00	+0.00	$0.00
+0.025	+3.92	+7.84	+$2.35
+0.050	+7.84	+15.67	+$4.70
+0.100	+15.67	+31.35	+$9.40
+0.200	+31.35	+62.70	+$18.81

Assumptions: 400 cfm; overall efficiency 0.30; 2,000 operating hours/year; illustrative electricity rate $0.30/kWh. Negative values illustrate a lower-loss measure case; they are not an observed result. Retail bill arithmetic is not the CEC LSC cost-effectiveness calculation.

At the +0.050 inch case, the illustrative increase is 7.84 W and 15.67 kWh/year. These calculations show sensitivity, not the performance of a listed cassette or a statewide estimate. Require clean and service-limit tests, terminal and DOAS fan accounting, and seasonal operating data before extrapolating. Where airflow falls after a filter change, correct the design or setting and remeasure rather than report the reduced fan use as a successful outcome.

4.3 Incremental First Cost

Use current written quotations for the actual measure and baseline combinations. Include filter racks/adaptors, any fan or control changes, installation labor, electrical changes where required, access work, design, and verification. The worksheet in Section 3.6 demonstrates the accounting structure; its assumed hours and rate do not establish a market-average cost.

4.4 Incremental Maintenance Costs

Compare replacement media, change frequency, cleaning displaced by disposable filters, technician time, access, disposal, inspection, and loading-related energy on both sides of the baseline. Replacement frequency should follow the manufacturer, actual loading, and required airflow, including wildfire conditions; no single statewide replacement interval is proposed.

For transparency, an assumed service case of three replacements/year, $30 of media per replacement, and 0.25 labor hour per visit at $120/hour produces $180/year of gross filter-service cost. This is not an observed price or an incremental cost: deduct the baseline’s media, cleaning, and service costs, and account for shared service visits. Add measured incremental fan electricity separately.

A 2022 office-building simulation study used $7 and $11 purchase costs for MERV 10 and MERV 13 filters, respectively, $17 labor per replacement, and a four-month service life, yielding modeled annual filter costs of $72 and $84. This is a published historical modeling benchmark, not current California pricing or a cassette cost estimate. Its value here is illustrating the need to compare complete annual service costs rather than filter price alone. [20]

4.5 Cost Effectiveness

A California-wide BCR has not been established for either component. Evaluate nonresidential and single-family impacts separately, and assess affected multifamily units if the draft cross-reference carries the amendment into that scope. Request CEC guidance on the applicable lifecycle method and health co-benefits. Do not insert assumed health-dollar benefits into the energy BCR without an accepted method. [3]

Report health and exposure findings separately from energy, source-energy, greenhouse-gas, and financial results. The literature and manufacturer examples justify reassessment of a blanket duct-length proxy, but they do not prove that every design has negligible fan-energy or first-cost impacts. WSC and Local 104 request a focused technical review to complete these adoption findings while preserving the objective of broader filtration coverage.

5 STATEWIDE IMPACTS

5.1 Statewide Energy and Energy Cost Savings

No statewide kWh or dollar saving is claimed. Report nonresidential and single-family impacts separately, plus any affected multifamily population. Estimate newly covered units by system and building type, climate, project trigger, prior code coverage, operating schedule, filter loading, and fan/control design. For homes with several terminals, count indoor units and their actual airflows; avoid counting the same ventilation filter more than once. Appendix B identifies needed inputs.

5.2 Statewide Greenhouse Gas Emissions Savings

Not quantified. Apply the approved 2028 hourly emissions factors to validated incremental electricity and fuel effects. An increase in fan electricity can increase emissions; a lower-pressure design or system-level efficiency improvement can offset it only when demonstrated. Do not assign the energy savings of a bundled HVAC upgrade entirely to this filtration amendment.

5.3 Statewide Water Savings

No direct water saving is proposed or quantified. Do not assign a water benefit without an identified mechanism and a separate accepted calculation.

5.4 Statewide Material Impacts

Additional disposable media and filter assemblies may increase material use and disposal. Compare them with the baseline’s disposable or washable media and cleaning practices, including filter service life. Quantities and lifecycle impacts have not been established.

5.5 Environmental Impacts

The principal intended environmental-health benefit is reduced exposure to particles entering through ventilation and infiltration or generated indoors. Actual exposure reduction depends on filtration efficiency, bypass, recirculation, ventilation, fan operation, sources, and building envelope conditions. MERV 13 does not eliminate all PM2.5 exposure or remove CO2 and gaseous pollutants; maintain required ventilation and source control. [12, 14, 17]

5.6 Other Impacts

A uniform requirement can reduce interpretation disputes and make clear that heat-transfer medium and air-filtration performance are separate design decisions. Verify comfort, airflow, noise, service access, and owner understanding. Public schools and communities with high outdoor particle exposure deserve explicit attention, while avoiding an unsupported numerical estimate of educational, health-care, or productivity savings.

6 PROPOSED CODE LANGUAGE

6.1 Energy Code Title 24 Part 6

Delete only the marked duct-length phrases. Retain the surrounding filter efficiency, both-air-stream, sizing, pressure, labeling, service-access, ventilation, and existing exception provisions. Section numbers below identify current law and the October 12, 2026 pre-rulemaking draft. [1, 2]

6.1.1 Nonresidential applicability

Current Section 120.1(c)1A.i; draft Section 401.2.1.1.1, item 1 (printed p. 4-50; PDF p. 467):

Mechanical space-conditioning systems that supply air to an occupiable space ~~through ductwork exceeding 10 ft (3 m) in length~~.

6.1.2 Single family applicability

Current Section 150.0(m)12A.i (printed p. 399; PDF p. 415); draft Section 402.2.6.12, item 1 (printed p. 4-156; PDF p. 573):

Mechanical space-conditioning systems that supply air to an occupiable space ~~through ductwork exceeding 10 feet (3 m) in length~~.

In draft item 1, retain the existing second sentence requiring compliance with Section 402.2.6.12.4 for air-filter product labeling. Under current numbering, references to Section 150.0(m)12A.i already carry the expanded category into Subsections B and E; no separate change to those cross-references is needed.

6.1.3 Matching residential draft edits

The 2028 draft replaces two current category references with repeated applicability wording. Delete the same qualifier from each repetition so sizing and labeling continue to apply to the expanded category.

Draft Section 402.2.6.12.1.2, Pressure drop, second paragraph (printed p. 4-156; PDF p. 573):

Mechanical space-conditioning systems that supply air to an occupiable space ~~through ductwork exceeding 10 feet (3 m) in length~~ shall be equipped with air filters that meet either option below:

Retain both filter-depth options and their face-velocity and pressure conditions without change.

Draft Section 402.2.6.12.4, Air filter product labeling (printed p. 4-159; PDF p. 576):

Mechanical space-conditioning systems that supply air to an occupiable space ~~through ductwork exceeding 10 feet (3 m) in length~~ shall be equipped with air filters that have been labeled by the manufacturer to disclose the efficiency and pressure drop ratings that demonstrate conformance with Sections 402.2.6.12.2 and 402.2.6.12.3 [Sections 150.0(m)12C and 150.0(m)12D].

6.1.4 Scope and implementation

Apply the amendments to new construction and applicable additions or alterations under current Sections 141.0 and 150.2 and their draft counterparts. No separate universal existing-equipment retrofit trigger is proposed. A filtered ventilation supply alone does not demonstrate filtration of separately recirculated terminal air. Separate school duties continue. Coordinate the residential adoption path and the draft Section 403.2.2.2 multifamily cross-reference as described in Section 2.2.2.

6.2 Reference Appendices

No express-terms appendix amendment is proposed here. Review existing nonresidential acceptance and residential verification provisions for newly covered configurations. RA3.1.4.8 uses manufacturer airflow/pressure ratings and does not require field diagnostic measurement of installed filter pressure drop for that check. Keep those adopted distinctions clear when requesting additional performance data for the measure analysis. Any new mandatory procedure should be published explicitly. [42]

6.3 Compliance Manuals

Update both nonresidential and single-family manuals with the air-path examples in Table 3, unit/filter schedules, applicable pressure and sizing limits, and examples for additions and replacements. Include ventilation systems serving ductless terminals and a clear explanation of nominal versus actual filter dimensions. Retain required ventilation and explain that outdoor-air filtration alone does not filter separately recirculated room air. [1, 43]

6.4 ACM Reference Manuals

Validate both nonresidential and residential representation of outdoor-air and terminal fans, pressure loss, fan schedules, and filtration-related controls. Use the applicable prototypes, weather, and economic factors. No new software credit, reduced outdoor ventilation rate, or continuous terminal-fan mandate is proposed.

6.5 Compliance Forms

Coordinate nonresidential and residential form changes with Section 2.1.5. Preserve existing inspection and verification roles. Require sufficient equipment and air-path evidence for the actual installation; a marketing claim or a portable room cleaner alone does not demonstrate compliance with the amended HVAC filtration provisions.

7 REFERENCES

References identify electronic or supplied sources. The existing searchable exhibit packet, WSC_Local104_MERV13_Exhibits_ASHRAE_Update.pdf, retains its manufacturer, original workshop, and ASHRAE pages. Added research, statutory, and residential code sources are identified here and have not been appended to that earlier packet. Revision date: November 4, 2026. A citation or technical review does not imply endorsement.

[1] California Energy Commission (2025). 2025 Building Energy Efficiency Standards. Sections 120.1(c)1 (printed pp. 205–206), 150.0(m)12 (pp. 399–401), 150.0(o)1D, 150.2, and 160.2(b)1. Supplied complete code reviewed for this revision; Exhibit X5 retains the earlier Section 120.1(c) excerpt.

[2] California Energy Commission (October 12, 2026). Pre-Rulemaking Draft Regulatory Text for the 2028 Energy Code, TN 273088. Section 401.2.1.1.1, printed pp. 4-50 to 4-51; PDF pp. 467-468. Added residential review: Section 402.2.6.12 and its subsections, printed pp. 4-156–4-159 / PDF pp. 573–576; Section 403.2.2.2, printed p. 4-194 / PDF p. 611.

[3] California Energy Commission (2026). 2028 Energy Code Measure Proposal Template. Supplied template; Sections 2-5 describe scope, market, energy, lifecycle costs, and statewide impacts.

[4] International Association of Plumbing and Mechanical Officials. Uniform Mechanical Code, 2024 and 2027 editions. Section 311.2.1; compare the authoritative edition and applicable amendments for each project.

[5] California Building Standards Commission / IAPMO (2025). 2025 California Mechanical Code. Sections 311.2.1 and 401.3; agency adoption and project scope remain applicable.

[6] California Building Standards Commission (October 29, 2026). CALGreen Workshop 2, Agenda Item 3d, Filters. Supplied express terms and rationale; Exhibit X6.

[7] Division of the State Architect (reviewed October 16, 2026). Draft Repeal Duplicative Filters Section, CALGreen Section 5.504.5. Supplied Attachment A; Exhibit X7.

[8] Carrier Corporation (May 2018). Variable Refrigerant Flow, Two-pipe Heat Recovery and Heat Pump Systems, document 01-VRF-014-25. Printed p. 28 / PDF p. 30; copyright/date on PDF p. 44. Selected pages are Exhibit X4.

[9] Samsung HVAC (revised June 14, 2021). Technical Bulletin TB2019-0002, MF-C6A0 MERV 13 Filter Installation Requirements. Manufacturer-authored bulletin; supplied full copy is Exhibit X2.

[10] Samsung HVAC (October 18, 2019). MF-C6A0 MERV 13 Filter for Samsung DVM S Cassette Units, SHA-DVMS-10182019. Supplied six-page manufacturer submittal; Exhibit X3.

[11] Daikin (undated supplied performance sheet). Submittal Data Sheet, DACA-FQP13-1K MERV 13 Adaptor Kit. Two-page source, Table 1.0 and dimensional drawing; Exhibit X1. Do not substitute a general product brochure for these airflow/pressure data.

[12] U.S. Environmental Protection Agency. Particle Pollution Exposure. Health effects and populations at increased risk.

[13] Pistochini, T., et al. (2020). Improving Ventilation and Indoor Environmental Quality in California K-12 Schools. CEC-500-2020-049, abstract and classroom filtration/modeling results. UC Davis WCEC and Lawrence Berkeley National Laboratory.

[14] UC Davis Western Cooling Efficiency Center. Improving Indoor Air Quality in California Schools. School ventilation, filtration, testing, and maintenance recommendations.

[15] ASHRAE Technical Committee 9.7 (2023). Design Guidance for Education Facilities, Version 2.0. HVAC Equipment Filtration Upgrades, printed pp. 14-16.

[16] National Air Filtration Association (May 26, 2021). Position Statement on ASHRAE Epidemic Task Force Core Recommendations. Design-stage accommodation, sealing, and filter-system performance.

[17] ASHRAE (2021). Debunking Myths About MERV, Air Filtration. Filter operation, bypass, and the distinction between particle removal and gaseous contaminants.

[18] Pacific Northwest National Laboratory. High-MERV Filters, Building America Solution Center. Pressure-drop dependence on filter area, depth, and airflow. Residential guidance is used here for physical principles, not nonresidential compliance determinations.

[19] Autoplicity (listing checked October 29, 2026). Daikin-McQuay DACA-FQP131K MERV 13 Filter Kit, 20.5 by 20.5 by 1.5. Posted price $602.68; one retailer observation, not an installed-cost quotation.

[20] Faulkner, C. A., et al. (2022). Tradeoffs among indoor air quality, financial costs, and CO2 emissions for HVAC operation strategies to mitigate indoor virus in U.S. office buildings. Building and Environment 221, 109282; Table 2 contains historical modeling cost assumptions.

[21] California Statewide CASE Team (August 2018). Residential Indoor Air Quality Results Report, 2019-RES-IAQ-F. Section 4.2, printed p. 6, documents earlier duct-length language and development of filter-depth requirements.

[22] California Energy Commission. Docket 25-BSTD-03, 2028 Energy Code Pre-Rulemaking. Index checked October 29, 2026; targeted contents review described in Appendix A.

[23] California Statewide CASE Team (June 17, 2026 docketing). HVAC Air Distribution Final CASE Report, TN 270760. Printed p. 55 / PDF p. 68 discusses MERV 13 as an air-cleaning strategy; other sections address DOAS controls.

[24] California Energy Commission with NORESCO and Glumac (2026). Existing Building Performance HVAC Upgrades and Building Commissioning, TN 270684. Controls, replacement-triggered commissioning, and implementation coordination.

[25] California Statewide CASE Team (July 17, 2026). Enhancements to Nonresidential Mechanical System Acceptance Language, TN 271540. Editorial acceptance-language coordination; not a filtration-scope amendment.

[26] Neil Bulger, A2 Efficiency (July 17, 2026). Comments on Proposed Section 120.1(d)6, Modulating DOAS, TN 271542. Concerns about mandatory modulation hardware, cost baselines, and field performance; not an identified opposition to this filtration proposal.

[27] California Statewide CASE Team (July 17, 2026). HVAC Return Plenums Comment Letter, TN 271537. Printed p. 4 / PDF p. 5 expressly places its draft plenum mandate outside the 2028 cycle, as a possible 2031 measure.

[28] California Statewide CASE Team (July 17, 2026). Prescriptive Transfer Air Modifications, TN 271538. Toilet-room transfer-air clarification and exhaust balance.

[29] California Energy Commission (June 17, 2026 docketing). Existing Building Alterations Large Single Zone Heat Pump Rooftop Units, TN 270685. Coordinate alteration triggers and equipment selection without conflating heat-transfer medium and filtration.

[30] National Energy Management Institute / Steven Winstead (July 16, 2026). Comments on ATT Commissioning and Related Compliance Measures, TN 271500. PDF pp. 7-8 support bringing certified ATTs into the commissioning design team; other positions in the filing are outside this proposal.

[31] California Statewide CASE Team (June 17, 2026 docketing). Nonresidential HVAC Fault Detection and Diagnostics Final CASE Report, TN 270774. Related controls and diagnostic work; no MERV 13 scope deletion identified in the targeted text review.

[32] ASHRAE. Dental Facilities Technical Resources. Section on main HVAC filters describes some newer MERV 13 products with pressure losses similar to older MERV 8 filters. The statement is not a performance guarantee for all filters or for the cassette examples.

[33] ASHRAE (August 2025 first public review). Proposed Addendum y to Standard 62.2-2025. Supplied two-page draft, reproduced in ANSI Standards Action, September 12, 2025, pp. 55–56; Exhibit X8. Direct residential comparison for Section 150.0(m)12. Proposed Exception 2 ends January 1, 2029; the draft specifies MERV 11.

[34] ASHRAE (2011). 2011 Addenda Supplement to Standard 62.2-2010, Addendum b. Section 6.7, PDF p. 5, reproduces the 10-foot trigger with MERV 6. Evidence of historical wording, not proof of California's original adoption rationale.

[35] ASHRAE (approved November 8, 2022). Addendum m to Standard 62.2-2022. Section 6.7, PDF p. 3, increases minimum filtration from MERV 6 to MERV 11 while retaining the duct-length trigger.

[36] ASHRAE (2023). Standard 241, Control of Infectious Aerosols. Table 7-1, default infectious-aerosol removal efficiencies; associated MERV-A qualification and equivalent clean airflow provisions. Cited for infectious-aerosol calculations, not as a proposed new Energy Code filter rating.

[37] Pistochini, T., Mande, C., and Chakraborty, S. (2022). Modeling impacts of ventilation and filtration methods on energy use and airborne disease transmission in classrooms. Journal of Building Engineering 57, 104840. DOI: 10.1016/j.jobe.2022.104840. Sections 2.4–2.5, 3.2.1, and 4: filtration assumptions, annual energy, and conclusions. Open manuscript: https://pmc.ncbi.nlm.nih.gov/articles/PMC9225931/.

[38] Lawrence Berkeley National Laboratory, U.S. EPA, and U.S. DOE (August 23, 2023). Guidance to Control Airborne Infection Risks. Webinar, slides, and FAQ. William Bahnfleth's ASHRAE 241 presentation explains equivalent clean airflow from ventilation and recirculated-air cleaning. FAQ explains MERV-A qualification and the lack of calculation credit below MERV-A 11.

[39] Pistochini, T., UC Davis WCEC (November 4, 2026). Written technical review of this measure proposal. Comments and tracked edits in WSC_Local104_2028_MERV13_Proposal_ASHRAE_v2_WCECNotes_261104(1).docx, supplied by the submitters. Technical feedback on respiratory aerosols, the illustrative 1,000 cfm comparison, and energy; the 2022 publication is separately cited in Reference 37.

[40] Rodriguez, E. M., California Building Standards Commission (post-workshop update supplied by the submitters). Email and revised Agenda Item 3d snippet. BSC staff states that the original main-paragraph change will not be pursued and proposes Exception 2 for a ductless mini-split unable to accommodate MERV 13. This update supersedes the original main-paragraph proposal reproduced in Exhibit X6; no final adoption is implied.

[41] California Legislature. Education Code §17661. Subdivisions (a)–(c) and (e). Separate school ventilation and existing-system filtration duties. Reviewed November 4, 2026.

[42] California Energy Commission (2025). 2025 Reference Appendices. Supplied Reference Appendix(1).pdf. RA3.1.4.5, RA3.1.4.7–RA3.1.4.8, printed RA3-14–RA3-16; low-static VCHP filter-sizing and pressure checks, printed RA3-53. These distinguish existing field-verification rules from additional proposed equipment analysis.

[43] California Energy Commission (2025). 2025 Nonresidential Compliance Manual. CEC-400-2025-008. Chapter 4, Air Filtration, pp. 4-10–4-11 / supplied PDF pp. 97–98. Filtration rationale, scope, sizing, pressure, and service guidance; not a substitute for the single-family requirements in Reference 1.

[44] California Building Standards Commission. 2027 Triennial Commission Meetings and Nine Point Criteria. The AB 130 discussion identifies residential building-standard restrictions in Health and Safety Code §18930(g). CEC should confirm the applicable exception, adoption authority, and effective date for the residential component. Reviewed November 4, 2026.

APPENDIX A DOCKET COORDINATION

The October 29, 2026 screening covered 168 docket entries and selected nonresidential HVAC filings. It did not identify a separate 10-foot filtration deletion in the reviewed materials. This revision also examines residential draft Sections 402.2.6.12 and 403.2.2.2. The table identifies coordination points rather than a complete residential market or statutory review. [2, 22]

Table 8. Related docket filings and recommended coordination

Filing	Relationship to this recommendation	Coordination needed
TN 273088, draft text [2]	Direct text: §§401.2.1.1.1 and 402.2.6.12 retain the limits; the latter repeats them in sizing and labeling. §403.2.2.2 points multifamily attached units to the residential filtration section.	Apply both core deletions and matching draft edits in Section 6.1; confirm the multifamily effect and residential adoption path.
TN 270760, air distribution [23]	Aligned premise: printed p. 55 recognizes MERV 13 as a useful air-cleaning strategy, potentially less energy intensive than increased ventilation.	Confirm modeling of terminal filtration and DOAS fans; retain required outdoor air. Do not infer blanket compliance or a permitted ventilation reduction.
TN 271542, DOAS comments [26]	Identifies cost-baseline and field-control concerns in the proposed modulation requirement. It is not a comment on this new filtration proposal.	Do not add room-level damper or controls mandates through the filtration redline. Use matched baselines and actual operating evidence.
TN 270684 and TN 271540, commissioning and acceptance [24, 25]	Aligned implementation opportunity: stronger verification and clearer acceptance references.	Include filtration checks in coordinated existing workflows where appropriate; avoid duplicate certificates and unsupported testing claims.
TN 271500, NEMI comments [30]	Its ATT-commissioning portion supports early involvement of qualified testing personnel.	Coordinate design-stage review and training; do not imply NEMI has endorsed this specific MERV amendment.
TN 271537, return plenums [27]	Separate issue. Its proposed plenum mandate is expressly presented for possible 2031 consideration, not adoption in 2028.	This measure does not require ducted returns, prohibit plenums, or resolve the return-plenum debate. Preserve filtration of applicable recirculated air for either permitted return strategy.
TN 271538, transfer air [28]	Addresses using transfer air for toilet-room exhaust makeup; no direct MERV scope conflict identified.	Preserve ventilation, air-class, pressure, fire/smoke, and exhaust requirements. Do not invent filtration at every transfer opening.
TN 270685, heat-pump alterations [29]	Related equipment-selection and replacement-trigger coordination.	Clarify which altered systems are newly covered and include filter provisions when selecting equipment.
TN 270774, fault detection [31]	Potential implementation complement; no direct deletion of this limit identified.	Do not assume an FDD system proves filter efficiency, sealing, or terminal airflow without an actual relevant test.

APPENDIX B TECHNICAL CALCULATIONS

B.1 Transparent screening inputs

Table 9. Inputs, evidence category, and final-analysis treatment

Input	Value used here	Evidence category and treatment
Airflow	400 cfm	Illustrative constant delivered airflow; replace with measured design and operating data.
Pressure difference	-0.025 to +0.200 in. water	Sensitivity cases, not observed product comparisons; measure baseline and proposed filters at equal airflow and loading conditions.
Overall fan efficiency	0.30	Analytical assumption; use measured watts and fan/control data for the final case.
Runtime	2,000 hours/year	Analytical assumption; final modeling needs hourly schedules and controls.
Retail electricity rate	$0.30/kWh	Illustration only; not an actual tariff or the CEC LSC method.
Accessory price	$602.68	One dated retailer listing; verify current product and installed quotations. [19]
Labor	1.0 installation hour plus 0.5 setup/verification hour at $120/hour	Analytical assumptions, not market survey results.
Filter service	Three visits/year, $30 media/visit, 0.25 hour/visit at $120/hour	Analytical assumptions; gross service cost is $180/year before subtracting baseline costs.

Reproducible +0.050 inch screening case: 400 cfm corresponds to 0.188779 cubic meters/second, and 0.050 inch water corresponds to 12.4544 Pa. Air power is 2.351 W; dividing by 0.30 gives 7.84 electrical watts. At 2,000 hours this is 15.67 kWh/year, or $4.70 at the illustrative rate. These rounded quantities are derived from the stated assumptions; none is a measured cassette result.

B.2 Statewide and lifecycle evaluation

Estimate newly affected indoor units separately for nonresidential and single-family projects, and for multifamily attached units if affected by the shared draft provision. Identify project triggers and prior code coverage; collect model-specific clean and loaded performance; obtain installed and service quotations; model climate, hourly schedules, and terminal fan cycling; and apply CEC-approved lifecycle and emissions factors. Report health benefits separately. Distinguish new construction, replacements, ductless, and short-duct cases.

B.3 Evidence needed for a complete equipment finding

For each representative system, obtain current manufacturer confirmation of the exact unit/filter/accessory combination; rated efficiency and any permitted equivalent; nominal depth and actual dimensions; required face area; clean and service-limit pressure curves at relevant flows; fan settings, true watts and sound data; airflow through each outdoor and recirculated path; sealing and access details; and service requirements. Confirm market availability and applicable alteration conditions. MCA is a circuit-sizing quantity and cannot be converted directly into operating watts. [8-11]

ASHRAE 62.2 provides direct residential context for Section 150.0(m)12 through California's Section 150.0(o)1D. The historical match also suggests, but does not prove, the origin of Section 120.1(c)'s qualifier. Proposed Addendum y supports filtration regardless of duct length in the residential standard; California would need to amend its own text and retain its MERV 13 rating. Manufacturer data support equipment-specific review rather than a permanent duct-length proxy. [1, 8-11, 21, 33-35]

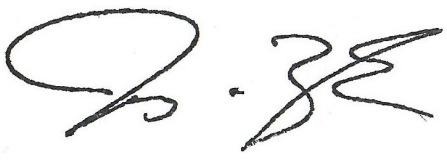
APPENDIX C SOURCE EXHIBIT INDEX

The earlier source-exhibits PDF remains the companion manufacturer and workshop record. It includes the complete supplied two-page ASHRAE Addendum y draft as Exhibit X8, PDF pp. 26–27. Exhibit X6 shows the superseded original BSC main-paragraph proposal; Reference 40 identifies the staff update. The complete supplied Energy Code, Reference Appendices, and Nonresidential Compliance Manual informed this revision and are cited in References 1, 42, and 43. Residential code and later research/statutory sources have not been appended to the earlier exhibit packet.

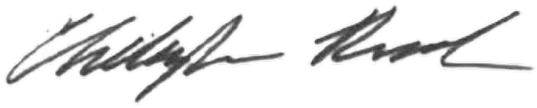
Table 10. Accompanying source exhibits

Exhibit	Source and original pages	Purpose
X1	Daikin DACA-FQP13-1K performance submittal, pp. 1-2	Model-specific airflow, filter pressure drop, dimensions, and source drawing.
X2	Samsung TB2019-0002, revised June 14, 2021, pp. 1-9	Field fan settings, airflow information, and circuit-sizing cautions.
X3	Samsung MF-C6A0 submittal, October 18, 2019, pp. 1-6	Filter dimensions, published efficiency, and setup requirements.
X4	Carrier 01-VRF-014-25, PDF pp. 30 and 44	Two-inch cassette filter option and publication date.
X5	Supplied 2025 Energy Code Section 120.1(c), printed p. 205	Current applicability, both-air-stream rule, sizing, and bypass provisions.
X6	BSC October 29, 2026 workshop item 3d, pp. 1-2	Original workshop proposal, retained for history. Main-paragraph approach superseded by the BSC staff update identified in Reference 40.
X7	DSA draft Section 5.504.5 repeal attachment, pp. 1-2	Proposed removal of DSA applicability and duplication rationale.
X8	ASHRAE proposed Addendum y to 62.2-2025, August 2025 first public review, supplied pp. 1-2 (ANSI pp. 55-56)	Direct residential comparison for Section 150.0(m)12; historical background for Section 120.1(c); proposed duct-length removal and January 1, 2029 transition.

WSC and Local 104 request a coordinated CEC, CBSC, and DSA technical discussion that preserves MERV 13 protections while resolving equipment and implementation issues. We offer HVAC technician experience and participation in review of actual manufacturer and field data.



Jeremy Zeedyk
Grant Administrator/Special Projects Coordinator
Western States Council



Christopher Ruch
Codes and Standards Representative
SMART Sheet Metal Workers Local 104