



Summary of the
**California Schools Healthy Air, Plumbing, and Efficiency (CalSHAPE)
Ventilation Program**

aka the
**School Reopening Ventilation and Energy Efficiency Verification and Repair
(SRVEVR) Program**

This document is intended to provide a “summary” (50+ pages of Guidelines condensed into 23 pages) of the CalSHAPE Ventilation Program as developed by the California Energy Commission (CEC) to provide our clients with a general understanding of the Guidelines as developed by the CEC. The Summary represents our synopsis, analysis, and interpretation of the newly released Guidelines. It is not a replacement for or an alternative to the information contained in the Guidelines. By definition, a Summary does not contain important detail that only the complete document can provide. Clients are encouraged to review the Guidelines in their entirety for complete information.

Background

Established by Assembly Bill (AB) 841 [Ting, Chapter 372, Statutes of 2020], the School Energy Efficiency Stimulus (SEES) Program consists of two programs: the *School Reopening Ventilation and Energy Efficiency Verification and Repair Program* (SRVEVR) and the *School Noncompliant Plumbing Fixture and Appliance Program* (SNPFA). For simplicity purposes, the California Energy Commission (CEC) refers to the SRVEVR program as the California Schools Healthy Air, Plumbing, and Efficiency (CalSHAPE) Ventilation Program and the SNPFA program as the CalSHAPE Plumbing Program.

Both programs will be administered by the CEC in collaboration with utility companies and funded from the energy efficiency budgets of California’s large electric and gas investor-owned utilities corporations. The CalSHAPE Ventilation Program and CalSHAPE Plumbing Program are separate programs, and grant awards will be made specific to each program. This summary is specific to the CalSHAPE Ventilation Program.

The CalSHAPE Ventilation Program provides grants to Local Educational Agencies (LEAs), charter schools, and regional occupational centers for the reasonable costs of the assessment of heating, ventilation, and air conditioning (HVAC) systems including the preparation of assessment reports, general maintenance, adjustment of ventilation rates, filter replacements, and carbon dioxide monitor installation as well as limited grants to conduct certain repairs, upgrades, or replacements to HVAC systems to ensure that systems are functional, energy-efficient, and meet current classroom ventilation requirements. The CalSHAPE Ventilation Program prioritizes investments in facilities in underserved communities and those near freeways or industrial facilities.

The CalSHAPE Ventilation Program will operate for three years in 2021, 2022, and 2023. There will be \$165 million available for 2021 and the CEC estimates \$375 million+ total will be available for the 3 years this program will be funded.

Ineligible Uses of the Grant

Grants are site-specific and may not be used for the following:

- Costs incurred outside the terms of the grant agreement
- Costs associated with the use and continued monitoring of the carbon dioxide monitors, such as electrical improvements, subscription charges, storage, and central hubs
- Purchase of equipment not an integral part of the project, or purchase of any portable equipment not directly connected to the eligible HVAC systems
- Replacement of existing funding sources for ongoing programs
- Costs stemming from DSA requirements [e.g., accessibility (ADA) requirements]
- Consultant fees
- For expenses/costs incurred on other sites

Construction Requirements

All construction work for repairs, upgrades, or replacements must be performed by a skilled and trained workforce which can include contractors or LEA in-house staff. If the scope of work is subject to public works requirements as determined by the Department of Industrial Relations, applicants must consider payment of prevailing wage and any other applicable laws.

Reporting Requirements After Project Completion

Upon completion of all work funded by this grant, the LEA must submit a final document package to the CEC, including:

- A. HVAC Assessment Report
- B. HVAC Verification Report
- C. Site-specific project summary detailing the use of the 20% contingency funding.
- D. Final invoice and any supporting documentation for all expended funds up to the original grant award amount (e.g., documentation demonstrating how the 20% contingency funds were spent)
- E. Additional reporting detail as required to calculate or confirm energy savings or reduction in greenhouse gas emissions resulting from the project.
- F. Self-certification and attestations – LEA will certify: it followed the CalSHAPE Ventilation Program Guidelines; that the information provided in the final document package is true and correct; all CEQA requirements were completed; DSA’s approval was obtained, if applicable; all Assessment and Maintenance Grant Terms and Conditions were complied with; skilled and trained workforce requirements, and other labor requirements, were complied with; applicable DIR and Labor Code requirements on prevailing wage were adhered to; reporting requirements were complied with; expended funds are subject to audit; it commits to participate with the CEC or its delegate in the assessment of energy savings or greenhouse gas emission reductions, including providing access to project sites, equipment, and information; and, it acknowledges it may be subject to a post-program site visit and measurement and evaluation study conducted by the CEC or its delegate.

Project Completion Deadlines

Recipients of the HVAC Assessment and Maintenance Grant have a maximum of 24 months to complete all work and to submit final reporting documentation (e.g., HVAC Verification Report, etc.) electronically on the CalSHAPE Program webpage. A one-time extension of no more than 6 months may be requested to complete final reporting, not to exceed the final date of program reporting of June 1, 2026. Timelines of completion for recipients of the HVAC Upgrade and Repairs Grant have not been determined as funding has not been made available and program requirements have not been established.

ATTACHMENT A

HVAC Assessment and Maintenance Pathway

Grant Requirements

LEAs with sites with at least one HVAC system that is not scheduled for replacement within 2 years of the application submittal date must follow this pathway and have an assessment of and maintenance conducted on all air-handling units, rooftop units and unitary and single zone equipment in HVAC system(s), as applicable. In addition, the findings of the assessment and other recommendations must be documented in a report and then verified as completed in another report as described below. Some work must be completed by qualified testing personnel², skilled and trained workforce, qualified adjusting personnel³, or licensed professional⁴ where noted.

Assessment and Maintenance Requirements

HVAC Requirements

STEP 1: Filtration

- 1) LEAs must install (replace or upgrade) filtration with a minimum efficiency reporting value (MERV) of 13 or better, where feasible, after qualified testing personnel review system capacity and airflow to determine the highest MERV filtration that can be installed without adversely impacting equipment. If MERV 13 is not feasible, then the highest MERV filtration that can be used in the system without adversely impacting the equipment must be installed. Qualified testing personnel must ensure filters are installed correctly. Purchase of additional filters is not an eligible cost. Costs associated with any additional repairs such as adjustments or repairs to increase fan capacity may only be funded with the 20% contingency grant.
- 2) If a system uses ultraviolet germicidal irradiation (UVGI) to disinfect the air, the UVGI lamp shall be checked for proper operation, replacing bulbs as needed and verifying that the ultraviolet light does not shine on filters. Purchase of additional UVGI lamps is not an eligible cost. Costs associated with any additional repairs and replacements may only be funded with the 20% contingency grant.
- 3) For systems with economizers, qualified testing personnel must test economizer dampers pursuant to Section B of NRCA-MCH-05-A-Air Economizer Controls. Dampers and controls that are not properly functioning must be repaired by a skilled and trained workforce. Costs associated with any additional repairs and replacements may only be funded with the 20% contingency grant.
- 4) Recommendations of additional maintenance, replacement, or upgrades to the above must be recorded in an HVAC Assessment Report.

STEP 2: Ventilation

After the filtration requirements in #1~4 above are completed, ventilation rates in the facility classrooms, auditoriums, gymnasiums, nurses offices, restrooms, and other occupied areas must be

² Qualified testing personnel is an HVAC acceptance test technician certified to complete the forms set forth in subparagraph (B) of paragraph (1) of subdivision (b) of Section 10-103.2 of Part 1 of Title 24 of the California Code of Regulations by an acceptance test technician certification provider (ATTCP) that is approved by the CEC to provide that certification; or, a certified testing, adjusting, and balancing (TAB) technician.

³ Means either of the following: (1) A certified TAB technician. (2) A skilled and trained workforce under the supervision of a TAB Technician.

⁴ A licensed professional is defined as a professional eligible under Division 3 (commencing with Section 5000) of the Business and Professions Code in the applicable classification to perform system design, construction, or installation of features, materials, components, or manufactured devices for mechanical systems.

verified by a qualified testing personnel to assess whether they meet the minimum ventilation requirements set forth in Table 120.1-A of Part 6 (commencing with Section 100.0) of Title 24 (see Appendix C attached to this summary). The finding must be documented in the HVAC Assessment Report and include:

- 1) Calculation of the required minimum outside air ventilation rates for each occupied area based on the anticipated occupancy and the minimum required ventilation rate per occupant set forth in Table 120.1-A. Calculations shall be based on maximum anticipated classroom or other occupied area occupancy rates and determined by the performing technician. Natural Ventilation shall be designed in accordance with Section 402.2 of the California Mechanical Code (Part 4 (commencing with Section 1.1.0) of Title 24 of the California Code of Regulations) and shall include mechanical ventilation systems designed in accordance with Section 403.0, Section 404.0, or both of those sections, of the California Mechanical Code.
- 2) Measurement of outside air pursuant to Section B of NRCA-MCH-02-A-Outdoor Air Acceptance and verification of whether the system provides the minimum outside air ventilation rates calculated above.
- 3) Survey readings of inlets and outlets to verify all ventilation is reaching the served zone and that there is adequate distribution. Verify if inlets and outlets are balanced within tolerance of the system design. Document read values and deficiencies. If the original system design values are not available, document available information and note unavailability of system design values in the assessment report.
- 4) Verification of building pressure relative to the outdoors to ensure positive pressure differential and to ensure the building is not over pressurized.
- 5) Verification of coil velocities and coil and unit discharge air temperatures required to maintain desired indoor conditions and to avoid moisture carry over from cooling coils.
- 6) Verification that separation between outdoor air intakes and exhaust discharge outlets meet requirements of the California Building Code Section 120.1.
- 7) Confirmation that the air handling unit is bringing in outdoor air and removing exhaust air as intended by the system design.
- 8) Measurement of all exhaust air volume for exhaust fans, including restrooms. Any discrepancies from system design must be documented.
- 9) If the system does not meet the minimum ventilation rate requirements set forth in Table 120.1-A, it must be documented in the HVAC Assessment Report and a licensed professional or qualified adjusting personnel shall review the system airflow and capacity to determine if additional ventilation can be provided without adversely impacting equipment performance and building indoor environmental quality. If additional ventilation can be provided, a qualified adjusting personnel shall adjust ventilation rates to meet the minimum ventilation rate requirements set forth in Table 120.1-A to the extent feasible. After the adjustment, the measurement and verifications required in (2), (4), and (5) above shall be repeated. If minimum ventilation rate requirements set forth in Table 120.1-A cannot be met, this deficiency shall be reported in the HVAC Assessment Report, the HVAC Verification Report, and addressed by a licensed professional as required below.

STEP 3: Demand Control Ventilation

If a demand control ventilation is installed, it shall be adjusted to a carbon dioxide set point of 800 ppm or less and tested by a qualified testing personnel pursuant to Section B of NRCA-MCH-06-A-Demand Control Ventilation Systems Acceptance. If the demand control ventilation system does not maintain average daily maximum carbon dioxide levels below 1,100 ppm, it shall be disabled until such

time as the LEA determines that the COVID-19 crisis has passed, unless disabling the control would adversely affect operation of the overall system. When disabling a demand control ventilation system, the system must be configured to meet the minimum ventilation rate requirements and tested and adjusted to provide a notification through a visual indicator on the monitor, such as an indicator light, or other alert system, such as an electronic mail, text, or cellular telephone application, when the carbon dioxide levels in the classroom have exceeded 1,100 ppm.

Recommendations for additional maintenance, replacement or upgrades shall be recorded in the HVAC Assessment Report. Costs associated with any additional maintenance, replacements, or upgrades may only be funded with the 20% contingency grant.

STEP 4: Coil Condition

A qualified testing personnel or a skilled and trained workforce shall verify coil condition, condensate drainage, cooling coil air temperature differentials (entering and leaving dry bulb), heat exchanger operation, and drive assembly. If repairs, replacement, or upgrades are necessary, these deficiencies shall be reported in the HVAC Assessment Report, the HVAC Verification Report, and addressed by the licensed professional pursuant to Sections 1626 and 1627. Costs associated with any repairs, upgrades, or replacements may only be funded with the 20% contingency grant.

STEP 5: Additional Requirements

A qualified testing personnel or qualified adjusting personnel shall:

- 1) Review control sequences to verify systems will maintain intended ventilation, temperature, and humidity conditions during school operation. For previously unoccupied buildings, the recommended practices of reopening a building as covered in the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Building Readiness document – Restarting a Building shall be performed.
- 2) Verify a daily flush is scheduled per ASHRAE Guidance for Reopening and Operating Schools and Buildings or otherwise applicable local or state guidance.
- 3) Verify that HVAC system operational times, exhaust fans operation times, setpoints, and enabled features meet ASHRAE Guidance for Reopening and Operating Schools and Buildings or otherwise applicable local or state guidance.

If installed HVAC systems or system components are broken, fail to meet minimum ventilation requirements, or are unable to operate to the original design and intent, this information must be included in the HVAC Assessment Report to be provided to a licensed professional for determination of appropriate corrective measures. Repairs, upgrades, or replacements shall be performed by a skilled and trained workforce. The costs associated with the repairs, upgrades, or replacements can only be funded with the 20% contingency grant. Requirements for filtration levels, ventilation rates, and ventilation schedules may be amended by the CEC based on the latest COVID-19 or other applicable guidance.

Carbon Dioxide Monitoring Requirements

- 1) Installation: To ensure proper ventilation is maintained throughout the school year, all classrooms in schools receiving a Ventilation Program grant shall be equipped with a carbon dioxide monitor that meets all of the following requirements:
 - The monitor is hard-wired or plugged-in and mounted to the wall between three and six feet above the floor and at least five feet away from the door and operable windows.

- The monitor displays the carbon dioxide readings to the teacher through a display on the device or other means such as a web-based application or cellular phone application.
- The monitor provides a notification through a visual indicator on the monitor, such as an indicator light, or other alert system, such as an electronic mail, text, or cellular telephone application, when the carbon dioxide levels in the classroom have exceeded 1,100 ppm.
- The monitor maintains a record of previous data that includes at least the maximum carbon dioxide concentration measured.
- The monitor has a range of 400 ppm to 2000 ppm or greater.
- The monitor is certified by the manufacturer to be accurate within 75 ppm at 1,000 ppm carbon dioxide concentration and is certified by the manufacturer to require calibration no more frequently than once every five years.

Verification of the installation of carbon dioxide monitors in all classrooms shall be included in the HVAC Assessment Report described below. The monitor and installation, and initial adjustment of the monitor, are the only costs eligible for Ventilation Program grants that must be included in the contractor estimate and not exceed the maximum award for monitor installation.

- 2) Continued Monitoring of Levels: If a classroom carbon dioxide concentration exceeds 1,100 ppm more than once a week as observed by the teacher or the facilities staff, the classroom ventilation rates shall be adjusted by qualified testing or adjusting personnel to ensure peak carbon dioxide concentrations in the classroom remain below the maximum allowable carbon dioxide ppm setpoint. Requirements for future adjustments by a qualified testing or adjusting personnel cannot be included in the contractor estimate.

Additional Requirements

To the extent applicable, the requirements listed under Attachment B, *Scheduled for Replacement Pathway Requirements*, and Attachment C, *Limited or No Mechanical Ventilation Pathway Requirements*, must also be completed. For example, if the HVAC system in one building of ten buildings on a site is scheduled for replacement, then the requirements detailed under the section *Scheduled for Replacement Pathway Requirements* must be followed. If at the same site one other building does not have an HVAC system, then the requirements detailed under the section *Limited or No Mechanical Ventilation Pathway Requirements* must be followed.

HVAC Assessment Report Requirements

A qualified testing personnel or qualified adjusting personnel must prepare the HVAC Assessment Report which must then be reviewed by a licensed professional. HVAC Assessment Report Worksheets will be made available by the CEC for use in developing the report. There will be 10 worksheets available as described in Appendix B of the Guidelines and as attached below. The HVAC Assessment Report must include all of the following information:

- 1) Name and address of school facility and person or contractor preparing and certifying assessment report.
- 2) Documentation of HVAC equipment model number, serial number, general condition of unit, and any additional information that could be used to assess replacement and repair options given potential for increased energy efficiency benefits.
- 3) Either verification that MERV 13 filters have been installed or the maximum MERV-rated filter that the system is able to effectively handle has been installed and what that MERV-rating is.

- 4) The verified ventilation rates for facility classrooms, auditoriums, gymnasiums, nurses' offices, restrooms, offices, and other occupied areas, and whether those rates meet the requirements set forth in Table 120.1-A. If ventilation rates do not meet applicable requirements, then an explanation for why the current system is unable to meet those rates shall be provided.
- 5) The verified exhaust for facility classrooms, auditoriums, gymnasiums, nurses' offices, restrooms, and other occupied areas and whether those rates meet the requirements set forth in the design intent.
- 6) Documentation of system deficiencies and recommendations for additional maintenance, replacement, or upgrades to improve energy efficiency, safety, or performance.
- 7) Name of the utility that provides electricity service and monthly electricity meter data.
- 8) Documentation on existing HVAC infrastructure to assist the design professional (not defined in the Guidelines) in determining ventilation options.
- 9) LEAs may be required to submit additional information as described or otherwise required by the CEC's guidelines, including but not limited to the information described in Appendix B.

A licensed professional shall review the HVAC Assessment Report completed for sites following the *HVAC Assessment and Maintenance Pathway* and:

- 1) Determine what, if any, additional adjustments or repairs are necessary to meet the minimum ventilation and filtration requirements,
- 2) Determine whether any cost-effective energy efficiency upgrades or replacements are warranted or recommended, and
- 3) Provide an estimated cost for this work. If the cost of recommended repairs, upgrades, or replacements are greater than the 20% contingency amount provided in the grant, then the licensed professional and the LEA may submit an application for additional funding, called the HVAC Upgrade and Repair Grant, should funding become available for this purpose.

HVAC Verification Report Requirements

After the assessments, maintenance, and HVAC Assessment Report are finished, an HVAC Verification Report must be completed. The CEC will have an HVAC Verification Report form available for use in developing the report on its website for each school funded with a grant, including the following information:

- 1) Name and address of school facility and person or contractor preparing and certifying report.
- 2) Description of assessment, maintenance, adjustment, repair, upgrade, and replacement activities and outcomes.
- 3) Verification that the LEA has complied with all requirements of the law authorizing this program and the implementing guidelines.
- 4) Verification that either MERV 13 filters have been installed or verification that the maximum MERV-rated filter that the system is able to effectively handle has been installed and what that MERV-rating is.
- 5) The verified ventilation rates for facility classrooms, auditoriums, gymnasiums, nurses' offices, restrooms, offices and other occupied areas and whether those rates meet the requirements set forth in Table 120.1-A. If ventilation rates do not meet applicable guidance, then an explanation for why the current system is unable to meet those rates shall be provided.
- 6) The verified exhaust for facility classrooms, auditoriums, gymnasiums, nurses' offices, restrooms, and other occupied areas and whether those rates meet the requirements set forth in the design intent.

- 7) Documentation of system deficiencies and recommendations for additional maintenance, replacement, or upgrades to improve energy efficiency, safety, or performance, or for additions of mechanical ventilation and filtration where none exists.
- 8) Documentation of initial operating verifications, adjustments, and final operating verifications, and document any adjustments or repairs performed.
- 9) Verification of installation of carbon dioxide monitors, including make and model of monitors to ensure monitors meet required capabilities.
- 10) Verification that all work has been performed by qualified testing personnel or qualified adjusting personnel, or other qualified technician as specified in the program guidelines, including the provision of the contractor's name and license; acceptance test technician name and certification number, where applicable; TAB technician name and certification number, where applicable; and verification that all construction work has been performed by a skilled and trained workforce.

The LEA must maintain a copy of the HVAC Verification Report for three years from the grant award date and make it available to anyone upon request. HVAC Verification Reports submitted following the completion of an HVAC Assessment and Maintenance Grant project will form the basis for submitting an application for an HVAC Upgrade and Repairs Grant when funding becomes available and program requirements are established.