DOCKETED	
Docket Number:	18-BSTD-02
Project Title:	2019 ENERGY CODE COMPLIANCE MANUALS
TN #:	232778-15
Document Title:	2019-CF2R-MCH-27a-Single Family Attached Detached Ventilationpdf
Description:	N/A
Filer:	Corrine Fishman
Organization:	California Energy Commission
Submitter Role:	Public Agency
Submission Date:	4/20/2020 8:45:49 AM
Docketed Date:	4/20/2020

INDOOR AIR QUALITY AND MECHANICAL VENTILATION

CERTIFICATE OF INSTALLATION		CF2R-MCH-27-H
Indoor Air Quality and Mechanical Ventilation		(Page 1 of 6)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City:	Zip Code:

Title 24, Part 6, Section 150.0(o) **Ventilation for Indoor Air Quality.** All dwelling units shall meet the requirements of ANSI/ASHRAE Standard 62.2-2016 Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings subject to the amendments specified by Title 24, Part 6, Section 150.0(o)1

A. Dwelling Mechanical Ventilation - General Information		
01	Dwelling Unit Name	
02	Building Type	
03	Project Scope	
04	Total Conditioned Floor Area of Dwelling Unit (For addition projects the conditioned floor area equals existing area plus addition area)	
05	Number of Bedrooms in Dwelling Unit (For addition projects the number of bedrooms equals the existing bedrooms plus addition bedrooms)	
06	Ventilation System Type	
07	Ventilation Operation Schedule	

Note:
Non-dwelling units do not meet the definition for a dwelling unit as defined in Section 100.1(b). Non-dwelling units are not designed to provide independent living facilities and do not provide permanent provisions for living, sleeping, eating, cooking and sanitation.

MCH-27a – Single Family Attached/Detached Ventilation

B. Single Family Attached/Detached General Information		
01	Average Ceiling Height	
02	Total Conditioned Volume	
03	Vertical distance from the lowest above-grade floor to the highest ceiling in feet	
04	Air Changes Per Hour at 50 Pa	
05	Name of ANSI/ASHRAE Standard 62.2-2016 weather station for climate zone	
06	Weather and shielding factor (wsf) (Based on the city identified above)	

C. Ventilation - Total Ventilation Rate

A mechanical supply system, exhaust system, or combination thereof shall provide whole-building ventilation with outdoor air each hour at no less than the rate in 150.0(o)1Ci

01	Total Required Ventilation rate, (Q_{tot})	
02	Enclosure Leakage Rate (Q_{50})	
03	Effective Annual Average Infiltration Rate (Q_{inf})	
04	Total Exterior Envelope Surface Area	
05	Unshared Exterior Envelope Surface Area (exclude surface areas attached to garages or other dwelling units)	
06	Required Mechanical Ventilation Rate (Q_{fan})	

For information and data collection only. Not valid until registered with a HERS provider

CERTIFICATE OF INSTALLATION		CF2R-MCH-27-H
Indoor Air Quality and Mechanical Ventilation		(Page 2 of 6)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City:	Zip Code:

D. Installed Ventilation - Total Ventilation Rate

A mechanical supply system, exhaust system, or combination thereof shall provide whole-building ventilation with outdoor air each hour at no less than the rate in 150.0(o)1Ci

01	02	03	04	05
Fan Name	Fan Location	Runtime (Min/Hr)	Installed Mechanical Ventilation Rate (CFM)	Equivalent Continuous Ventilation (CFM)
06	Total Installed Equivalent Continuous Ventilation (CFM)			

E. Compliance Statement

01	

For information and data collection only. Not valid until registered with a HERS provider

CERTIFICATE OF INSTALLATION		CF2R-MCH-27-H
Indoor Air Quality and Mechanical Ventilation		(Page 3 of 6)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City:	Zip Code:

F. Other Requirements

The items listed below (6.1 through 6.6 and 6.8 through 6.9) correspond to the information given in ASHRAE 62.2 Section 6 "Other Requirements". Refer also to Chapter 4.6 of the Residential Compliance Manual (Section 4.6.8) for information describing these "Other Requirements". The signature of the Responsible Person in the declaration statement below certifies that the building complies with these requirements specified in ASHRAE 62.2 Section 6.1 through 6.9 if applicable.

01	**6.1 Adjacent Spaces and Transfer Air.** Measures shall be taken to minimize air movement across envelope components to dwelling units from adjacent spaces such as garages, unconditioned crawlspaces, unconditioned attics, and other dwelling. Supply and balanced ventilation systems shall be designed and constructed to provide ventilation air directly from the outdoors. 6.1.1 **Compliance for Attached Dwelling Units**. One method of demonstrating compliance with Section 6.1 shall be to verify a leakage rate below a maximum of 0.3 cfm per ft^2 (150 L/s per 100 m2) of the dwelling unit envelope area (i.e., the sum of the area of walls between dwelling units, exterior walls, ceiling, and floor) at a test pressure of 50 Pa by a blower door test conducted in accordance with either ANSI/ASTME779 or ANSI/ASTM-E1827. The test shall be conducted with the dwelling unit as if it were exposed to outdoor air on all sides, top, and bottom by opening doors and windows of adjacent dwelling units.
02	**6.2 Instructions and Labeling.** Information on the ventilation design and/or ventilation systems installed, instructions on their proper operation to meet the requirements of this standard, and instructions detailing any required maintenance (similar to that provided for HVAC systems) shall be provided to the owner and the occupant of the dwelling unit. Controls shall be labeled as to their function (unless that function is obvious, such as toilet exhaust fan switches). See Section 13 of ASHRAE Guideline 24 [5] for information on instructions and labeling.
03	**6.3 Clothes Dryers.** Clothes dryers shall be exhausted directly to the outdoors. Exception: Condensing dryers plumbed to a drain.
04	**6.4 Combustion and Solid-Fuel Burning Appliances.** 6.4.1 Combustion and solid-fuel-burning appliances must be provided with adequate combustion and ventilation air and installed in accordance with manufacturers' installation instructions; NFPA 54/ANSI Z223.1, *National Fuel Gas Code*; NFPA 31, *Standard for the Installation of Oil-Burning Equipment*; or NFPA 211, *Standard for Chimneys, Fireplaces, Vents, and Solid-Fuel Burning Appliances*, or other equivalent code acceptable to the building official. 6.4.2 Where atmospherically vented combustion appliances or solid-fuelburning appliances are located inside the pressure boundary, the total net exhaust flow of the two largest exhaust fans (not including a summer cooling fan intended to be operated only when windows or other air inlets are open) shall not exceed 15 cfm per 100 ft2 (75 L/s per 100 m2) of occupiable space when in operation at full capacity. If the designed total net flow exceeds this limit, the net exhaust flow must be reduced by reducing the exhaust flow or providing compensating outdoor air. Gravity or barometric dampers in nonpowered exhaust makeup air systems shall not be used to provide compensating outdoor air. Atmospherically vented combustion appliances do not include direct-vent appliances. Combustion appliances that pass safety testing performed according to ANSI/BPI-1200, Standard Practice for Basic Analysis of Buildings,21 shall be deemed as complying with Section 6.4.2.
05	**6.5 Air tightness Requirements** 6.5.1 **Garages.** When an occupiable space adjoins a garage, the design must prevent migration of contaminants to the adjoining occupiable space. Air seal the walls, ceilings, and floors that separate garages from occupiable space. To be considered air-sealed, all joints, seams, penetrations, openings between door assemblies and their respective jambs and framing, and other sources of air leakage through wall and ceiling assemblies separating the garage from the residence and its attic area shall be caulked, gasketed, weather stripped, wrapped, or otherwise sealed to limit air movement. Doors between garages and occupiable spaces shall be gasketed or made substantially airtight with weather stripping.
06	**6.6 Ventilation Opening Area.** Spaces shall have ventilation openings as listed below. Such openings shall meet the requirements of Section 6.8. Exception: Attached dwelling units and spaces that meet the local ventilation requirements set for bathrooms in Section 5 [of ASHRAE 62.2]. 6.6.1 **Habitable Spaces.** Each habitable space shall be provided with ventilation openings with an openable area not less than 4% of the floor area or less than 5 ft2 (0.5 m2). 6.6.2 **Toilets and Utility Rooms**. Toilets and utility rooms shall be provided with ventilation openings with an openable area not less than 4% of the room floor area or less than1.5 ft2 (0.15 m2). Exceptions: 1. Utility rooms with a dryer exhaust duct. 2. Toilet compartments in bathrooms.

For information and data collection only. Not valid until registered with a HERS provider.

CERTIFICATE OF INSTALLATION		CF2R-MCH-27-H
Indoor Air Quality and Mechanical Ventilation		(Page 4 of 6)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City:	Zip Code:

07	**6.8 Air Inlets.** Air inlets that are part of the ventilation design shall be located a minimum of 10 ft (3 m) from known sources of contamination such as a stack, vent, exhaust hood, or vehicle exhaust. The intake shall be placed so that entering air is not obstructed by snow, plantings, or other material. Forced air inlets shall be provided with rodent/insect screens (mesh not larger than 1/2 in. [13 mm]). Exceptions: 1. Ventilation openings in the wall may be as close as a stretched-string distance of 3 ft (1 m) from sources of contamination exiting through the roof or dryer exhausts. 2. No minimum separation distance shall be required between windows and local exhaust outlets in kitchens and bathrooms. 3. Vent terminations covered by and meeting the requirements of the National Fuel Gas Code (NFPA 54/ANSI Z223.1)7 or equivalent. 4. Where a combined exhaust/intake termination is used to separate intake air from exhaust air originating in a living space other than kitchens, no minimum separation distance between these two openings is required. For these combined terminations, the exhaust air concentration within the intake airflow shall not exceed 10%, as established by the manufacturer.
08	**6.9 Carbon Monoxide Alarms.** A carbon monoxide alarm shall be installed in each dwelling unit in accordance with NFPA 720, *Standard for the Installation of Carbon Monoxide (CO) Detection and Warning Equipment*, and shall be consistent with requirements of applicable laws, codes, and standards.
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.	

For information and data collection only. Not valid until registered with a HERS provider

CERTIFICATE OF INSTALLATION		CF2R-MCH-27-H
Indoor Air Quality and Mechanical Ventilation		(Page 5 of 6)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City:	Zip Code:

G. Air Moving Equipment

The items listed below (7.1 through 7.4) correspond to the information given in ASHRAE 62.2 Section 7 "Air-Moving Equipment". Refer also to Chapter 4.6 of the Residential Compliance Manual (Section 4.6.9) for information describing these requirements in more detail. The signature of the Responsible Person in the declaration statement below certifies that the building complies with these requirements specified in ASHRAE 62.2 Section 7.1 through 7.4 if applicable.

01	**7.1 Selection and Installation.** Ventilation devices and equipment serving individual dwelling units shall be tested in accordance with ANSI/ASHRAE Standard 51/AMCA 210, *Laboratory Methods of Testing Fans for Aerodynamic Performance Rating*, and ANSI/AMCA Standard 300, *Reverberant Room Method for Sound Testing of Fans*, and rated in accordance with the airflow and sound rating procedures of the Home Ventilating Institute (HVI) (HVI 915, *Loudness Testing and Rating Procedure*; HVI 916, *Air Flow Test Procedure* ; and HVI 920, *Product Performance Certification Procedure Including Verification and Challenge*). Installations of systems or equipment shall be carried out in accordance with manufacturers' design requirements and installation instructions.
02	**7.2 Sound Ratings for Fans.** Ventilation fans shall be rated for sound at no less than the minimum airflow rate required by this standard as noted below. These sound ratings shall be at a minimum of 0.1 in. of water (25 Pa) static pressure in accordance with the HVI procedures referenced in Section 7.1. Exception: HVAC air handlers and remote mounted fans need not meet sound requirements. To be considered for this exception, a remote mounted fan must be mounted outside the habitable spaces, bathrooms, toilets, and hallways, and there must be at least 4 ft (1 m) of ductwork between the fan and the intake grille. 7.2.1 **Dwelling-Unit Ventilation or Continuous Local Exhaust Fans.** These fans shall be rated for sound at a maximum of 1.0 sone. 7.2.2 **Demand-Controlled Local Exhaust Fans.** Bathroom exhaust fans used to comply with Section 5.2 shall be rated for sound at a maximum of 3 sone. Kitchen exhaust fans used to comply with Section 5.2 shall be rated for sound at a maximum of 3 sones at one or more airflow settings greater than or equal to 100 cfm (47 L/s). Exceptions: 1. Fans with a minimum airflow setting exceeding 400 cfm (189 L/s) need not comply. 2. Kitchen Range hoods may be rated for sound at the static pressure determined at working speed as specified in HVI 916 section 7.
03	**7.3 Exhaust Ducts.** 7.3.1 **Multiple Exhaust Fans Using One Duct.** Exhaust fans in separate dwelling units shall not share a common exhaust duct. If more than one of the exhaust fans in a single dwelling unit shares a common exhaust duct, each fan shall be equipped with a backdraft damper to prevent the recirculation of exhaust air from one room to another through the exhaust ducting system. 7.3.2 **Single Exhaust Fan Ducted to Multiple Inlets.** Where exhaust inlets are commonly ducted across multiple dwelling units, one or more exhaust fans located downstream of the exhaust inlets shall be designed and intended to run continuously, or a system of one or more backdraft dampers shall be installed to isolate each dwelling unit from the common duct when the fan is not running.
04	**7.4 Supply Ducts.** Where supply outlets are commonly ducted across multiple dwelling units, one or more supply fans located upstream of all the supply outlets shall be designed and intended to run continuously, or a system of one or more backdraft dampers shall be installed to isolate each dwelling unit from the common duct when the fan is not running.

The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.

For information and plan collection only. Not valid until registered with a HERS provider

CERTIFICATE OF INSTALLATION		CF2R-MCH-27-H
Indoor Air Quality and Mechanical Ventilation		(Page 6 of 6)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City:	Zip Code:

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

1. I certify that this Certificate of Installation documentation is accurate and complete.

Documentation Author Name:	Documentation Author Signature:
Documentation Author Company Name:	Date Signed:
Address:	CEA/HERS Certification Identification (if applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Installation is true and correct.
2. I am either: a) a responsible person eligible under Division 3 of the Business and Professions Code in the applicable classification to accept responsibility for the system design, construction, or installation of features, materials, components, or manufactured devices for the scope of work identified on this Certificate of Installation and attest to the declarations in this statement, or b) I am an authorized representative of the responsible person and attest to the declarations in this statement on the responsible person's behalf.
3. The constructed or installed features, materials, components or manufactured devices (the installation) identified on this Certificate of Installation conforms to all applicable codes and regulations and the installation conforms to the requirements given on the Certificate of Compliance, plans, and specifications approved by the enforcement agency.
4. I understand that a HERS rater will check the installation to verify compliance and if such checking determines the installation fails to comply, I am required to offer any necessary corrective action at no charge to the building owner.
5. I will ensure that a registered copy of this Certificate of Installation shall be posted, or made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a registered copy of this Certificate of Installation is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Builder/Installer Name:	Responsible Builder/Installer Signature:	
Company Name: (Installing Subcontractor or General Contractor or Builder/Owner)	Position With Company (Title):	
Address:	CSLB License:	
City/State/Zip:	Phone:	Date Signed:
Third Party Quality Control Program (TPQCP) Status:	Name of TPQCP (if applicable):	

For information and data reflection only. Not valid until registered with a HERS provider

CF2R-MCH-27a-H User Instructions

Section A. General Information

1. Building Unit Name: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document. This is the unique identifier for this dwelling unit. Needed mostly for multifamily dwelling units. Ventilation is calculated and provided for each dwelling unit individually.
2. Building Type: This field is filled out automatically. It is referenced from the CF1R. Values are "Single Family Attached", "Single Family Detached" and "Multifamily". User is allowed to overwrite imported value with "Non-dwelling unit" selection.
3. Project Scope: This field is filled out automatically. It is referenced from the CF1R.
    - If parent document is the CF1R-PRF-01, values are "Newly Constructed", "Newly Constructed (Addition Alone)" and "Addition and /or Alteration"
    - If parent document is CF1R-NCB-01, values are "Newly Constructed" and "Newly Constructed (Addition Alone)"
    - If parent document is CF1R-ADD-01, values are "ADU Addition < 300 ft^2"," ADU Addition > 300 to < 400 ft^2"," ADU Addition > 400 to < 700 ft^2" and "ADU Addition > 700 to < 1000 ft^2".
4. Total Conditioned Floor Area of Dwelling Unit: This field is filled out automatically. It is referenced from the CF2R-MCH-01.
5. Number of Bedrooms in Dwelling Unit: This field is filled out automatically. It is referenced from the CF2R-MCH-01.
6. Ventilation system Type: This may be filled out automatically or be user input.
    - If parent document is the CF1R-PRF-01, the value will be filled out automatically.
    - If building type is equal to Non-dwelling unit, an N/A value will be filled out automatically.
    - If parent document is the CF1R-NCB or CF1R-ADD, user selects from list of Supply, Exhaust, Balanced, Balanced – ERV, Balanced – HRV, Central Fan Integrated (CFI), Central Ventilation System – Supply and Central Ventilation System – Exhaust and Central Ventilation System Balanced.
7. Ventilation operation schedule: This may be filled out automatically or be user input.
    - Building type is equal to Non-dwelling unit; an N/A value will be filled out automatically.
    - User selects from list of Continuous, Short-Term Average, Scheduled and Real-time Control.
    - Note if "Ventilation System Type" (A06) = Central Fan Integrated & "Ventilation Operation Schedule" (A07) = Continuous; then user will not be allowed to proceed.

Section B. Single Family Attached/Detached General Information

1. Average Ceiling Height: This may be filled out automatically or be user input.
    - If parent document is the CF1R-PRF-01, the value will be filled out automatically.
    - If parent document is the CF1R-NCB or CF1R-ADD, user enter value in feet.
2. Total Conditioned Volume: This field is calculated and filled out automatically.
3. Vertical distance from the lowest above-grade floor to the highest ceiling in feet: This may be filled out automatically or be user input.
    - If parent document is the CF1R-PRF-01, the value will be filled out automatically.
    - If parent document is the CF1R-NCB or CF1R-ADD, user enters value in feet.
4. Air Changes Per Hour at 50 Pa: This may be filled out automatically or be user selected
    - If Building type is equal to Non-dwelling unit, an N/A value will be filled out automatically.
    - If Building type does not equal Non-dwelling unit, then user may select from Default (ACH50=2.0) or Measured (ACH50<2.0)
5. Name of ANSI/ASHRAE Standard 62.2-2016 weather station for climate zone: This may be filled out automatically or be user input.
    - If parent document is the CF1R-PRF-01, the value will be filled out automatically.
    - If Building type is equal to Non-dwelling unit, an N/A value will be filled out automatically.
    - If parent document is the CF1R-NCB or CF1R-ADD, user select value from Weather Stations from the Table X1 US Climates, Normative Appendix X.
6. Weather and shielding factor (wsf): This value is automatically entered based on the selection in #6.

Section C. Whole Building Continuous Ventilation – Total Ventilation Rate Method

1. This value is automatically calculated using equation 150.0-B from the Energy Standards.
2. This value automatically calculates using either equation 150.0-C or 150.0-D from the Energy Standards.
    - If air changes per hour from section B is equal to "Default" then equation, 150.0-C will be used.
    - If air changes per hour from section B is equal to "Measured" and the leakage value from the CF2R-MCH-24 is < 2.0 then equation 150.0-D will be used.
    - If air changes per hour from section B is equal to "Measured" and the leakage value from the CF2R-MCH-24 is ≥ 2.0 then equation 150.0-C will be used.
3. This value is automatically calculated using equation 150.0-E from the Energy Standards.
4. Total Exterior Envelope Surface Area: This value may be filled out automatically or be user input.
    - If building type from section A equals "Single Family Detached", an N/A value will be filled out automatically.
    - If building type from section A equals "Single Family Attached or multi-family" and the parent document is the CF1R-PRF-01 then value will be automatically entered.

For information and data collection only. Not valid until registered with a HERS Provider

- If building type from section A equals "Single Family Attached or Multi-family" and the parent document is the CF1R-NCB-01 or CF1R-ADD-01 then user enter value (ft^2).

5. Unshared Exterior Surface Area: This value may be filled out automatically or be user input.
   - If building type from section A equals "single family detached", an N/A value will be filled out automatically.
   - If building type from section A equals "single family attached or multi-family" and the parent document is the CF1R-PRF-01 then value will be automatically entered.
   - If building type from section A equals "single family attached or multi-family" and the parent document is the CF1R-NCB-01 or CF1R-ADD-01 then user enter value (ft^2).
6. This value is automatically calculated using equation 150.0-F from the Energy Standards.

Section D. Installed Ventilation – Total Ventilation Rate Method

1. User input text identifying the fan name for each installed ventilation fan.
2. User input text identifying the fan location for each installed ventilation fan.
3. Runtime (Min/Hr): This value may be filled out automatically or be user input.
   - If ventilation operation schedule from section B = "continuous", then value of 60 will be automatically entered.
   - If ventilation operation schedule from section B = "short term average", then user enter value of less than or equal to 60 for each installed ventilation fan.
4. User to enter CFM value from test procedures described in RA3.7.4 for each installed ventilation fan.
5. Equivalent continuous ventilation CFM is automatically calculated for each ventilation fan.
6. Total installed equivalent continuous ventilation CFM is automatically calculated based on the installed ventilation fans.

NORMATIVE APPENDIX X:
INFILTRATION EFFECTIVENESS WEATHER AND SHIELDING FACTORS (WSF)
TABLE X1 U.S. Climates

TMY3	wsf	Weather Station	Latitude	Longitude	State
690150	0.5	Twentynine Palms	34.3	–116.17	California
722860	0.43	March AFB	33.9	–117.25	California
722868	0.45	Palm Springs Intl	33.83	–116.50	California
722869	0.42	Riverside Muni	33.95	–117.45	California
722880	0.39	Burbank–Glendale–Pasadena AP	34.2	–118.35	California
722885	0.39	Santa Monica Muni	34.02	–118.45	California
722886	0.39	Van Nuys Airport	34.22	–118.48	California
722895	0.55	Lompoc (AWOS)	34.67	–120.47	California
722897	0.51	San Luis Co Rgnl	35.23	–120.63	California
722899	0.45	Chino Airport	33.97	–117.63	California
722900	0.38	San Diego Lindbergh Field	32.73	–117.17	California
722903	0.39	San Diego/Montgomery	32.82	–117.13	California
722904	0.4	Chula Vista Brown Field NAAS	32.58	–116.98	California
722906	0.39	San Diego North Island NAS	32.7	–117.20	California
722926	0.4	Camp Pendleton MCAS	33.3	–117.35	California
722927	0.38	Carlsbad/Palomar	33.13	–117.28	California
722930	0.39	San Diego Miramar NAS	32.87	–117.13	California
722950	0.42	Los Angeles Intl Arpt	33.93	–118.40	California
722956	0.38	Jack Northrop Fld H	33.92	–118.33	California
722970	0.38	Long Beach Daugherty Fld	33.83	–118.17	California
722976	0.34	Fullerton Municipal	33.87	–117.98	California
722977	0.36	Santa Ana John Wayne AP	33.68	–117.87	California
723805	0.51	Needles Airport	34.77	–114.62	California
723810	0.59	Edwards AFB	34.9	–117.87	California
723815	0.58	Daggett Barstow–Daggett AP	34.85	–116.80	California
723816	0.62	Lancaster Gen Wm Fox Field	34.73	–118.22	California
723820	0.57	Palmdale Airport	34.63	–118.08	California
723830	0.68	Sandberg	34.75	–118.72	California
723840	0.43	Bakersfield Meadows Field	35.43	–119.05	California
723890	0.45	Fresno Yosemite Intl AP	36.78	–119.72	California
723895	0.42	Porterville (AWOS)	36.03	–119.07	California
723896	0.43	Visalia Muni (AWOS)	36.32	–119.40	California
723910	0.45	Point Mugu Nf	34.12	–119.12	California

For information and data collection only. Not valid until registered with a HERS provider

NORMATIVE APPENDIX X:
INFILTRATION EFFECTIVENESS WEATHER AND SHIELDING FACTORS (WSF)
TABLE X1 U.S. Climates

TMY3	wsf	Weather Station	Latitude	Longitude	State
723925	0.44	Santa Barbara Municipal AP	34.43	–119.85	California
723926	0.43	Camarillo (AWOS)	34.22	–119.08	California
723927	0.45	Oxnard Airport	34.2	–119.20	California
723940	0.52	Santa Maria Public Arpt	34.92	–120.47	California
723965	0.53	Paso Robles Municipal Arpt	35.67	–120.63	California
724800	0.55	Bishop Airport	37.37	–118.35	California
724815	0.46	Merced/Macready Fld	37.28	–120.52	California
724830	0.51	Sacramento Executive Arpt	38.5	–121.50	California
724837	0.45	Beale AFB	39.13	–121.43	California
724838	0.5	Yuba Co	39.1	–121.57	California
724839	0.51	Sacramento Metropolitan AP	38.7	–121.58	California
724915	0.49	Monterey Naf	36.6	–121.87	California
725845	0.44	Blue Canyon AP	39.3	–120.72	California
725846	0.66	Truckee–Tahoe	39.32	–120.13	California
725847	0.64	South Lake Tahoe	38.9	–120.00	California
725905	0.47	Ukiah Municipal AP	39.13	–123.20	California
725910	0.5	Red Bluff Municipal Arpt 40.15 –122.25 California	40.15	–122.25	California
725920	0.47	Redding Municipal Arpt 40.52 –122.	40.52	–122.32	California
725945	0.56	Arcata Airport 40.98 –124.10 California	40.98	–124.10	California
725946	0.6	Crescent City Faa Ai 41.78 –124.2	41.78	–124.23	California
725955	0.55	Montague Siskiyou County AP 41.78 –122.47 California	41.78	–122.47	California
725958	0.59	Alturas 41.50 –120.5	41.5	–120.53	California
745090	0.45	Mountain View Moffett Fld NAS	37.4	–122.05	California
745160	0.67	Travis Field AFB	38.27	–121.93	California
746120	0.52	China Lake Naf	35.68	–117.68	California
747020	0.5	Lemoore Reeves NAS	36.33	–119.95	California
747185	0.46	Imperial	32.83	–115.58	California
747187	0.46	Palm Springs Thermal AP	33.63	–116.17	California
747188	0.48	Blythe Riverside Co Arpt	33.62	–114.72	California

For information and data collection only. Not valid until registered with a HERS provider