

- If either one or both of the volumes above and below a floor assembly is Unconditioned Space Volume, then the volume of the floor assembly shall be included.
- If the volume of both of the spaces horizontally adjacent to a wall assembly are Unconditioned Space Volume, then the volume of the wall assembly shall be included.
- The volume of an attic that is not both air sealed and insulated at the roof deck shall be included.
- The volume of a vented crawlspace shall be included.
- The volume of a garage shall be included, even when it is conditioned.
- The volume of a thermally isolated sunroom shall be included.
- The volume of an attic that is both air sealed and insulated at the roof deck, the volume of an unvented crawlspace, and the volume of a basement shall be included unless it meets the definition of Conditioned Space Volume.

Unitary – One or more factory-made assemblies which normally may include an evaporator or cooling coil, a compressor and condenser combination, and may include a heating function. The equipment can be ducted or ductless; it can be a split-system or single package.

Ventilation – The process of providing outdoor air directly to a Dwelling by natural or mechanical means. Such air may or may not be conditioned.

4. Task 1: Evaluation of the Design.

4.1. Overview. This procedure shall be completed by first collecting the design information specified in Section 4.2, then verifying that all required information has been provided and falls within the tolerances specified in Section 4.3.

As an alternative to completing the procedures defined in Section 4.2 and 4.3, if an Independent Verification Report is obtained containing the design information specified in Section 4.2 and confirmation that all required information has been provided and falls within the tolerances specified in Section 4.3, and the report is approved for use by an entity adopting and requiring the use of this Standard, then the reported values shall be permitted to be used.

4.2. Required Design Information. The following design information shall be collected by the person completing the evaluation for the Dwelling.

4.2.1. Architectural design documentation, consisting of the following:

- 4.2.1.1. The Architectural Plan.
- 4.2.1.2. Any Architectural Options for the Plan.

4.2.2. HVAC design basis, consisting of the following:

- 4.2.2.1. The designer name.
- 4.2.2.2. The designer company.
- 4.2.2.3. The date of design.

- 4.2.2.4. The architectural scope of the HVAC design, consisting of the following:
 - 4.2.2.4.1. If a Dwelling or Townhouse, or a Dwelling Unit or Sleeping Unit within:
 - 4.2.2.4.1.1. The name of the Architectural Plan that the HVAC design is based on or the unique address of the building.
 - 4.2.2.4.1.2. Any Architectural Option(s) used in the HVAC design, and a list of other Architectural Option(s), if any, that the design can be used with.
 - 4.2.2.4.2. If a Dwelling Unit or Sleeping Unit not within a Dwelling or Townhouse:
 - 4.2.2.4.2.1. A unique identifier for the building that the unit is within ⁷.
 - 4.2.2.4.2.2. The name of the Architectural Plan that the HVAC design is based on, and a list of other Architectural Plan(s), if any, that the design can be used with.
 - 4.2.2.4.2.3. Any Architectural Option(s) used in the HVAC design, and a list of other Architectural Option(s), if any, that the design can be used with.
- 4.2.2.5. If a software program was used to complete the design, the software program name and version that was used.

4.2.3. Dwelling-Unit Mechanical Ventilation System design for each system that serves the Dwelling, consisting of the following:

- 4.2.3.1. A unique name or identifier for the system ⁸.
- 4.2.3.2. The specified system type: supply, exhaust, balanced without recovery, ERV, HRV, ventilation dehumidifier, or other.
- 4.2.3.3. The specified control location for the system ⁹.
- 4.2.3.4. For systems serving Dwelling Units or Sleeping Units not within a Dwelling or Townhouse:
 - 4.2.3.4.1. The specified system manufacturer and model number.
 - 4.2.3.4.2. The unit(s) served by the system.
- 4.2.3.5. The name of the Ventilation zone(s) ¹⁰ served by the system.
- 4.2.3.6. An overview of each Ventilation zone that the system serves, consisting of the following information.
 - 4.2.3.6.1. The design basis for the Ventilation airflow rate and run-time for the Ventilation zone: ASHRAE 62.2-2010, ASHRAE 62.2-2013, or ASHRAE 62.2-2016, or Other Ventilation Standard.
 - 4.2.3.6.2. The number of Bedrooms within the Ventilation zone.
 - 4.2.3.6.3. The floor area of the Ventilation zone.

⁷ (Informative Note) For example, the name of the development or the building's address.

⁸ (Informative Note) For example, "Bath Fan 1", "ERV 1".

⁹ (Informative Note) Examples of common locations include bathroom or utility room.

¹⁰ (Informative Note) Examples of Ventilation zones include Whole Dwelling, Upper Level, Lower Level, Basement.

4.2.3.6.4. The design's Ventilation airflow rate, runtime per cycle, and cycle time for the Ventilation zone.

4.2.3.6.5. The design's time-averaged Ventilation airflow rate for the Ventilation zone, calculated using Equation 1.

$$Time_{Averaged} Vent Rate = Vent Rate \times \frac{Runtime Per Cycle}{Cycle Time} \quad (1)$$

Where:

Time_{Averaged} Vent Rate = The average Ventilation airflow rate.

Vent Rate = The design's Ventilation airflow rate reported in Section 4.2.3.6.4.

Runtime Per Cycle = The runtime per cycle reported in Section 4.2.3.6.4.

Cycle Time = The cycle time reported in Section 4.2.3.6.4.

4.2.4. Heat gain and heat loss loads for each heated or cooled zone in the Dwelling, consisting of the following:

- 4.2.4.1. The name of the heated or cooled zone ¹¹.
- 4.2.4.2. For Dwelling Units and Sleeping Units not within a Dwelling or Townhouse, the unit's location:
 - 4.2.4.2.1. The top floor, mid-level floor, or bottom floor of the building, and,
 - 4.2.4.2.2. Either a corner unit or middle unit that is between two other units.
- 4.2.4.3. The design basis for the heat gain and heat loss loads: ACCA Manual J v8, 2013; ACCA Manual J v8, 2016; 2017 ASHRAE Fundamentals; or per the Authority Having Jurisdiction.
- 4.2.4.4. Confirmation that the loads were calculated room-by-room.
Exception: For Dwelling Units and Sleeping Units not within a Dwelling or Townhouse, the loads shall be permitted to be calculated as a single block.
- 4.2.4.5. The indoor heating design temperature and indoor cooling design temperature used.
- 4.2.4.6. The outdoor heating design temperature, outdoor cooling design temperature, and the location and source of the outdoor conditions used ¹².
- 4.2.4.7. The number of occupants.
- 4.2.4.8. The total occupant internal gains.
- 4.2.4.9. The total non-occupant internal gains.
- 4.2.4.10. The Conditioned Floor Area.
- 4.2.4.11. The window area.

¹¹ (Informative Note) Examples of heated or cooled zones include Upper Level, Master Suite, Basement.

¹² (Normative Note) The location shall include the city or weather station and the state. The source shall be ACCA Manual J, ASHRAE Handbook of Fundamentals, or the Authority Having Jurisdiction.

- 4.2.4.12. The solar heat gain coefficient value used in the greatest amount of window area.
- 4.2.4.13. The nominal R-value of the insulation ¹³ used in the greatest amount of above-grade wall area.
- 4.2.4.14. The nominal R-value of the insulation used in the greatest amount of ceiling area.
- 4.2.4.15. The infiltration rate.
- 4.2.4.16. The time-averaged mechanical Ventilation airflow rate.
- 4.2.4.17. The calculated sensible, latent, and total heat gain at design conditions for one or more orientations.
- 4.2.4.18. If the heat gain has been provided for more than one orientation in Section 4.2.4.17, then the difference between the maximum and minimum total heat gain across the orientations specified.
- 4.2.4.19. The calculated total heat loss at design conditions.

4.2.5. Specifications for all HVAC Systems serving the Dwelling, consisting of the following for each HVAC System:

- 4.2.5.1. A unique name or identifier for the HVAC system.
- 4.2.5.2. The name of the heated or cooled zone(s) ¹⁴ that the HVAC system serves.
- 4.2.5.3. An equipment overview, consisting of the following for each piece of equipment:
 - 4.2.5.3.1. The equipment type: Air Conditioner, Boiler, Furnace, Heat Pump, or Other Equipment Type.
 - 4.2.5.3.2. The equipment manufacturer(s) and model number(s) ¹⁵.
 - 4.2.5.3.3. The AHRI Reference Number of the equipment.

Exception: If an AHRI Reference Number is not available, OEM-provided documentation shall be collected with the rated efficiency of the equipment. If the equipment contains multiple components, the rated efficiency shall reflect the specific combination of indoor and outdoor components, along with confirmation from the OEM that the two components are designed to be used together.

- 4.2.5.3.4. If the equipment type is an Air Conditioner, Furnace, or Heat Pump, then the Blower Fan motor type: Permanent Split Capacitor (PSC), Electronically Commutated Motor (ECM), or Other Motor Type.

¹³ (Informative Note) If both cavity and continuous insulation are used, the nominal R-value equals the sum of nominal R-value of the cavity and continuous insulation.

¹⁴ (Informative Note) Examples of zones include Whole Dwelling, Upper Level, Lower Level, Basement.

¹⁵ (Informative Note) For equipment types that include both an evaporator/fan-coil and a condenser, include the manufacturer and model number for both components.

- 4.2.5.3.5. If the equipment type is an Air Conditioner, Furnace, or Heat Pump, then the Blower Fan speed type: single-speed, two-speed, or variable-speed ¹⁶.
- 4.2.5.3.6. If the equipment type is an Air Conditioner or Heat Pump, then the compressor speed type: single-speed, two-speed, or variable-speed.
- 4.2.5.3.7. If the equipment type is an Air Conditioner or Heat Pump, then whether it is also a Mini-Split Air Conditioner, Mini-Split Heat Pump, Multi-Split Air Conditioner, or Multi-Split Heat Pump.
- 4.2.5.3.8. If the equipment type is a Heat Pump, then the ratio of its maximum rated capacity relative to its minimum rated capacity.
- 4.2.5.3.9. If the equipment type is an Air Conditioner or Heat Pump, then:
 - 4.2.5.3.9.1. The metering device type: piston or capillary tube, Thermal Expansion Value (TXV), or Electronic Expansion Valve (EEV).
 - 4.2.5.3.9.2. If the metering device type in Section 4.2.5.3.9.1 is TXV or EEV, then the OEM-specified subcooling target at the service valve.
- 4.2.5.3.10. If the equipment type is an Air Conditioner or Heat Pump, then the equipment's rated cooling efficiency ¹⁷.
- 4.2.5.3.11. If the equipment type is a Boiler, Furnace, or Heat Pump, then the equipment's rated heating efficiency.
- 4.2.5.3.12. If the equipment type is a Boiler or Furnace, then the heating capacity type: single-stage, two-stage, or modulating.
- 4.2.5.3.13. If the equipment type is a Boiler or Furnace, then the venting type, either Natural Draft System, Mechanical Draft System, or Direct-Vent Appliance.
- 4.2.5.4. The specified performance rating and metric ¹⁸ of each filter to be installed.
- 4.2.5.5. Duct system design elements, if a duct system will be installed, consisting of the following:
 - 4.2.5.5.1. The design Blower Fan airflow, expressed in cubic feet per minute or cubic meters per second of air with a density of 0.075 pounds per cubic feet (1.201 kg per cubic meter) ¹⁹:

¹⁶ (Informative Note) While equipment typically has multiple speed settings to select from during installation, this parameter is related to the number of operational speeds that the system is capable of. Single-speed indicates a system that operates at no more than one speed setting each for heating mode and cooling mode. Two-speed indicates a system that can operate at no more than two speeds each for heating mode and cooling mode. Variable-speed indicates a system that can operate at more than two speeds.

¹⁷ (Informative Note) For example, if the metric for the rated efficiency of the equipment is SEER, then its SEER rating shall be reported; if the metric is EER, then its EER rating shall be reported; if both SEER and EEER, then both rated values shall be reported.

¹⁸ (Informative Note) For example, MERV or FPR.

¹⁹ (Informative Note) Airflow at this air density is often referred to as Standard CFM (SCFM) or Standard CMS (SCMS) and represents air at 68 °F, 50% relative humidity, and at a barometric pressure of 29.92" Hg.