

MINHERS-2013 Addendum 20-2016

Adoption and Implementation of ANSI/RESNET/ICC 380-2016 Standard for Testing Airtightness of Building Enclosures, Airtightness of Heating and Cooling Air Distribution Systems, and Airflow of Mechanical Ventilation Systems

Chapter 2- RESNET NATIONAL STANDARD FOR TRAINING AND CERTIFICATION

205 Certification Candidates

205.2 Certification

205.2.2 Rating Field Inspector (RFI)

205.2.2.2 Complete at least five probationary Rating Field Inspections observed by a certified HERS rater or a quality assurance designee. The certified HERS Rater or QAD shall use the RESNET JobWerks RFI Tool to document the results of probationary inspections. The probationary Rating Field Inspections shall comprise at a minimum the following tasks.

205.2.2.2.1 Use pressure differential diagnostics to identify intermediate buffer zones including (but not limited to) attics, garages, or crawlspaces.

205.2.2.2.2 Identify insulation defects and account for them in energy analysis tool inputs.

205.2.2.2.3 Identify insulation types, thickness, and alignment with air barriers.

205.2.2.2.4 Measure pressure differences across the building envelope imposed by the operation of the home's equipment.

205.2.2.2.5 Perform envelope leakage testing in accordance with the airtightness testing protocols contained in ANSI/RESNET/ICC 380-2016.

205.2.2.2.6 Perform duct leakage testing in accordance with the duct testing protocols contained in ANSI/RESNET/ICC 380-2016 and interpret results.

205.2.2.2.7 Identify room and zone pressure imbalances caused by lack of ducted return air or pressure relief mechanisms such as transfer grilles or jumper ducts.

[205.2.2.2.8](#) Perform CAZ, spillage, and CO testing in accordance with Carbon Monoxide (CO) Test and Depressurization Test for the Combustion Appliance Zone (CAZ) protocols contained in [ANSI/ACCA 12 QH, Appendix A](#), Sections A4 and A5.

205.2.2.2.9 The effective date for item [205.2.2.2.8](#) is Jan 1, 2014. Rating Field Inspectors who were certified prior to Jan 1, 2014 shall pass the RESNET Combustion Appliance Test, and The Work Scope Development Tests before January 1, 2015.

205.2.3 Home Energy Rater (HERS Rater)

205.2.3.2 Demonstrate competency at certain tasks mentored by a Certified Trainer by completing two training ratings. These ratings shall not contain any errors identified by RESNET approved rating software. Both ratings shall have a reasonably acceptable level of accuracy when compared to the trainer's independent ratings of the same houses or building plans. The Trainer may choose these tasks to be performed in a hands-on environment, from house plans, or through RESNET approved computer simulations. However at least one of the two training ratings shall be a confirmed rating conducted in-person with a certified trainer on a real house. The candidate shall perform the following procedures during the confirmed training rating.

205.2.3.2.1 Use pressure differential diagnostics to identify intermediate buffer zones including (but not limited to) attics, garages, or crawlspaces.

205.2.3.2.2 Identify insulation defects and account for them in energy analysis tool inputs.

205.2.3.2.3 Identify insulation types, thickness, and alignment with air barriers.

205.2.3.2.4 Measure pressure differences across the building envelope imposed by the operation of the home's equipment.

205.2.3.2.5 Perform building envelope leakage testing in accordance with the airtightness testing protocols contained in ANSI/RESNET/ICC 380.

205.2.3.2.6 Perform duct leakage testing in accordance with the duct testing protocols contained in ANSI/RESNET/ICC 380-2016 and interpret results.

205.2.3.2.7 Identify room and zone pressure imbalances caused by lack of ducted return air or pressure relief mechanisms such as transfer grilles or jumper ducts.

205.2.3.2.8 Identify gas leaks using combustible gas sensing equipment. If a leak is found, recommend that a certified technician repair the leak.

[205.2.3.2.9 Perform CAZ, spillage, and CO testing in accordance with Carbon Monoxide \(CO\) Test and Depressurization Test for the Combustion Appliance Zone \(CAZ\) protocols contained in ANSI/ACCA 12 QH, Appendix A, Sections A4 and A5.](#)

205.2.3.2.10 Raters who were certified prior to January 1, 2014 shall pass the RESNET Combustion Appliance Test and The Work Scope Development Tests before January 1, 2015.

205.2.3.3 After passing the exam and completing the two training ratings, but prior to being certified, the candidate shall complete three probationary ratings with a Rating Provider. At least two of the three probationary ratings shall be confirmed ratings.

207 Capabilities

Certified individuals shall have certain capabilities to perform the work required under their certification. The categories listed in this section are contained in [Chapter 3 -](#), [Chapter 8 -](#), ANSI/RESNET/ICC 380-2016

and [Appendix 1 - On-Site Inspection Procedures for Minimum Rated Features](#). Certification candidates shall demonstrate proficiency at these capabilities through successful completion of certification requirements specified in [See Section 205 Certification Candidates](#). Training providers should ensure that their curricula effectively cover these items.

207.1 Home Energy Survey Professional (HESP)

Home Energy Surveys are primarily conducted on existing homes. HESPs do not perform any performance, diagnostic, or destructive testing. All capabilities listed here are limited to visually accessible items in the home unless otherwise noted.

207.1.5 Determining Conditioned Space Volume

207.1.5.1 Determine the Conditioned Space Volume of a dwelling unit as defined in Appendix B.

207.2 Rating Field Inspector (RFI)

A Rating Field Inspector is permitted to conduct all tasks contained within [Appendix A- On-Site Inspection Procedures for Minimum Rated Features](#). A Certified Rating Field Inspector shall have proficiency at the capabilities of a HESP in addition to the following items.

207.2.1 General

207.2.1.1 Use field inspection forms to identify and document the minimum rated features of the Reference Home and Rated Home in accordance with the requirements of [ANSI/RESNET/ICC 301-2014](#) – HERS Reference Home and Rated Home Configuration and [Appendix A- On-Site Inspection Procedures for Minimum Rated Features](#) – On-Site Inspection Procedures.

207.2.1.2 Identify potential problems with the building such as health and safety concerns, building durability issues, potential comfort problems, and possible elevated energy use.

207.2.1.3 Identify basic home construction types and the ramifications of these for energy usage.

207.2.2 Determining Conditioned Space Volume

207.2.2.1 Determine the Conditioned Space Volume of a dwelling unit as defined in Appendix B.

207.2.9 Framed Floors

207.2.9.1 Determine if framed floors are exposed to Conditioned Space Volume, Unconditioned Space Volume, or outdoors.

207.2.9.2 Determine floor system type and frequency of framing members.

207.2.9.3 Determine insulation thickness, type, and grade (I, II, or III).

207.2.10 Slab-on-Grade

207.2.10.1 Identify slab as covered or exposed.

207.2.11 Above Grade Walls

207.2.11.1 Determine if walls are exposed to Conditioned Space Volume, Unconditioned Space Volume, or outdoors.

207.2.11.2 Determine construction type, thickness, and exterior color.

207.2.16 Air Leakage

207.2.16.1 Identify air leakage mechanisms and drivers, energy and comfort implications, and health and safety issues.

207.2.16.2 Perform single-point and multi-point building envelope leakage testing in accordance with the airtightness testing protocols contained in ANSI/RESNET/ICC 380-2016.

207.2.16.3 Identify potential air sealing using zonal pressure differentials and measurement techniques

207.2.16.4 Measure pressure differences across the building envelope imposed by the operation of the home's equipment.

207.2.17 Conditioned Air Distribution Systems

207.2.17.1 Identify impacts of designed and imposed flaws (closed interior doors, blocked registers and grilles, air handler filters).

207.2.17.2 Identify duct supply and return types (flexible, rigid metal, building chase, insulated panels) and locations with respect to thermal and air barriers.

207.2.17.3 Identify room and zone pressure imbalances caused by lack of ducted return air or pressure relief mechanisms such as transfer grilles or jumper ducts.

207.2.17.4 Perform duct leakage testing in accordance with the duct testing protocols contained in ANSI/RESNET/ICC 380 and recommend sealing as needed based on test results.

207.2.17.5 Determine need for duct insulation in Unconditioned Space Volumes and specify thickness of retrofit insulation if needed.

207.3 Home Energy Rating System Rater (HERS Rater)

A Certified Home Energy Rater shall have proficiency at the knowledge and abilities of a HESP and a Rating Field Inspector in addition to the following.

207.3.2 RESNET Rating System

207.3.2.1 Communicate the business aspects of being a RESNET HERS Rater.

[207.3.2.2 Maintain current knowledge of the HERS Rating method using the Reference Home as defined in ANSI/RESNET/ICC 301-2014.](#)

207.3.2.3 Conduct both projected and confirmed building simulation and performance analysis to provide HERS Ratings in accordance with the requirements in [Chapter 3 –](#) and ANSI/RESNET/ICC 380-2016.

Chapter 3- NATIONAL HOME ENERGY RATING TECHNICAL STANDARDS

302 Definitions

The following terms have specific meanings as used in this Standard. In the event that definitions given here differ from definitions given elsewhere, including those given in [ANSI/RESNET/ICC 301-2014](#), the definitions given here shall govern.

303 Technical Requirements

303.1 Applicable Standards

All RESNET Home Energy Ratings conducted in accordance with this Standard shall comply with the provisions of ANSI/RESNET/ICC 301-2014, “Standard for the Calculation and Labeling of the Energy Performance of Low-Rise Residential Buildings using the HERS Index.”

Chapter 7- RESNET NATIONAL STANDARDS FOR HOME ENERGY AUDITS

703 National Home Energy Audit Procedures

703.2 HERS Rating on an Existing Home

The purpose of the HERS Rating on an existing home is to identify building performance deficiencies and provide a work scope sufficient for improvements to be made to the audited home. The HERS Rating Performance Audit includes an evaluation, performance testing, computer software analysis using software that is accredited by RESNET for this purpose, and reporting of proposed treatments for improvement of an existing home. The evaluation shall include a review of the data collected from any previous energy audit or survey, any further required measurement and performance testing, and combustion appliance testing. The Rater shall determine the appropriate work scope for the home. A homeowner may elect to go through this process with or without a prior Professional Home Energy Survey. A HERS Rating on existing home includes all of the provisions of the Professional Home Energy Survey ([Section 703.1.2.5](#)), plus the performance of diagnostic testing and reporting requirements as follows:

703.2.1 Evaluate building shell air leakage in CFM₅₀

At a minimum, a single point (50 Pa) blower door depressurization test shall be performed in accordance with the envelope testing protocols contained in ANSI/RESNET/ICC 380-2016 and the results thereof shall be included in the audit report.

703.2.2 Evaluate duct leakage.

703.2.2.1 The Auditor shall perform a duct leakage test in accordance with the protocols contained in ANSI/RESNET/ICC 380-2016 of these Standards, and/or specify a duct leakage test in accordance with RESNET standards prior to beginning any duct-sealing work.

Chapter 8- RESNET Standards

801 General Provisions

801.1 Purpose

This Standard will present procedures for work scope development and combustion safety testing.

801.2 Scope

The purpose of this document sets out the procedures for work scope development and combustion safety testing by which home energy ratings shall be conducted so their results will be acceptable to all public and private sector industries that may require an objective, cost-effective, sustainable home energy rating process.

801.3 Definitions and Acronyms

[See Appendix B- Glossary of Terms.](#)

802 Combustion Safety Testing

[802.1 The protocols contained in ANSI/ACCA 12 QH-2014, Appendix A](#), Sections A3 (Carbon Monoxide Test) and A4 (Depressurization Test for the Combustion Appliance Zone) shall be followed by RESNET-accredited Raters and Auditors (hereinafter referred to collectively as “Auditors”) performing combustion appliance testing.

802.2 Prior to conducting any test that affects the operating pressures in the home, the Auditor shall inquire whether a person that has environmental sensitivities (asthma, allergies, chemical sensitivity, etc.) is present in the home. If such a person is present, the Auditor shall not perform such tests without written disclosure from the affected party (or responsible adult). The written disclosure shall state (at a minimum) that “during the period of testing, some amount of dust, particles, or soil gases already present in the home may become airborne.” Without a signed disclosure, the Auditor shall either reschedule the test for a time when they will not be present, or ask them to leave the home during the testing process. The Auditor shall also inquire as to the presence of pets that may potentially be affected by testing procedures.

802.3 Gas Leakage Test

802.3.1 If there is a noticeable odor indicating gas buildup within the home, the occupants and Auditor shall leave the house and the appropriate authorities and utility providers shall be notified from outside the home.

802.3.2 The Auditor should use a gas detector upon entry into the home to detect the presence of natural gas. If gas is suspected or confirmed, ensure that switches are not operated while exiting and no ignition concerns are present. The audit shall not proceed until the proper authorities have deemed it safe to re-enter the home. If there is no noticeable odor indicating gas buildup within the home, the Auditor shall determine if there are gas leaks in the fittings and connections of natural gas appliances within the home and natural gas/liquid propane supply lines following these protocols.

802.3.3 Inspect all fittings and joints in supply lines and appliance connectors and confirm suspected leaks with leak-detection fluid. Identify for repair or replacement any kinked, corroded or visibly worn flexible gas lines and any flexible connectors manufactured prior to 1974.

802.3.4 Equipment needed.

802.3.4.1 Combustible gas detector capable of measuring 20 ppm

802.3.4.2 Leak detection fluid (non-corrosive)

803 Work Scope for Contractors

803.1 Requirements

803.1.1 All work must meet applicable codes and regulations for the jurisdiction.

803.1.2 When air sealing is being performed the work scope shall specify CAZ depressurization testing to be performed at the end of each workday.

803.1.3 The work scope for recommended improvements will be determined by the Auditor and shall be based upon the findings of the assessment, the client's needs and budget, and priorities identified during combustion appliance testing, subject to health and safety requirements.

803.1.4 The work scope shall clearly identify for the client any remedial actions which require prompt attention, affect safety, or require a licensed trade.

803.1.5 The work scope shall provide sufficient specification that the client may obtain reasonably comparable bids from alternative sources for making recommended improvements.

803.1.6 All scopes of work shall include this statement: "The estimated energy use and savings information contained in the audit report does not constitute a guarantee or warranty of actual energy cost or usage."

803.1.7 The work scope shall be developed based on the Auditor's diagnosis and analysis. Emphasis shall be on:

bringing air distribution system components inside the building enclosure when it is feasible, or sealing and insulating ducts when it is not; improving airflow and total HVAC system efficiency as applicable; upgrades to the building enclosure as applicable; improvements to lighting and appliances as applicable.

803.1.8 The scopes shall reflect the "house as a system" approach, recognizing measure interaction. The following statement shall be included whenever a fireplace or combustion appliance is located within the building enclosure:

"This work scope is not a list of recommendations that may be implemented independently; any exclusions or variations to this scope may increase the risk of flue gas spillage, back-drafting, carbon monoxide production and/or moisture problems within the home."

803.1.9 When specifying equipment replacement, new equipment sizing shall be based on the proposed, upgraded condition of the building enclosure and duct system.

803.1.10 The work scope shall call for post-work combustion appliance testing in accordance with these guidelines when any work affecting enclosure or duct tightness, or building pressures, is specified.

803.2 Work Scope: Carbon Monoxide

803.2.1 The source of the CO must be repaired or replaced and the problem corrected prior to commencing work on other tasks on the work scope, unless remediation of the CO production is specifically related to one or more of those tasks (such as duct repairs that will correct a large negative pressure in the CAZ).

803.2.2 If there are combustion appliances within the building envelope, a carbon monoxide detector should be specified in the main area of each floor according to manufacturer's recommendations, typically in the hallway outside each bedroom area.

803.2.3 If measured CO levels are higher than 100 ppm (200 for oven), or an appliance fails to meet manufacturer's specifications for CO production (whichever is higher), the work scope shall specify replacement or repair of the appliance, and the homeowner shall be notified of the need for service by a qualified technician.

803.3 Work Scope: Worst Case Depressurization

803.3.1 If the results of the Worst Case Depressurization Test indicate the potential for backdrafting by failing the CAZ pressure limits or spillage test, remediation of the failure must be addressed in the work scope, through one or more of the following (as applicable): targeted air- and duct-sealing, room pressure balancing, exhaust fan makeup air, or appliance replacement (with power- or direct-vented equipment). As an alternative, the combustion appliance zone may be isolated by creating a sealed combustion closet containing the combustion appliances that has the proper amount of combustion air supplied to it according to the applicable version of the IRC. Adequate sealing for isolation purposes shall include air sealing and duct sealing (especially of adjacent platform or cavity return ducts) and confirmed by another CAZ depressurization test.

803.3.2 The work scope should specify replacement of atmospheric-vented combustion appliances with high-efficiency sealed combustion, direct vent, or power vented appliances when feasible. If the home has unvented combustion appliances, the Auditor shall recommend they be disconnected and replaced with vented combustion appliances.

803.3.3 If unvented combustion appliances are not removed or replaced with vented combustion appliances or electric appliances, the work scope shall not specify measures that affect the air tightness of the envelope, including air sealing, duct sealing, sidewall insulation, or window replacements. Duct sealing outside the thermal envelope may be specified in IECC climate zones 1-3.

804 Referenced Standards

804.1 Auditor Referenced Standards

These referenced standards provide guidance for the Auditor in the performance of their role as an auditor or home energy rater (diagnostic testing, analysis, writing scopes of work).

1. Mortgage Industry National Home Energy Rating Systems Standards, published by the Residential Energy Services Network, latest version, <http://www.resnet.us>
2. ASTM E1998-02(2007) "Standard Guide for Assessing Depressurization-Induced Backdrafting and Spillage from Vented Combustion Appliances", published by ASTM International, <http://www.astm.org>

804.2 Contractor Work Scope Referenced Standards

These referenced standards should be referenced in the work scope, as applicable to provide guidance for the contractor to perform the work scope.

1. International Residential Code for One- and Two-Family Dwellings- 2006, published by the International Code Council, Inc., <http://www.iccsafe.org>
2. International Energy Conservation Code- 2006, published by the International Code Council, Inc., <http://www.iccsafe.org>
3. International Mechanical Code- 2006, published by the International Code Council, Inc., <http://www.iccsafe.org>
4. International Fuel Gas Code- 2006, published by the International Code Council, Inc., <http://www.iccsafe.org>
5. ANSI/ACCA Standard 5 QI-2007 HVAC Quality Installation Specification, published by the Air Conditioning Contractors of America, <http://www.acca.org>
6. Manual J, Residential Load Calculation, 8th edition, published by the Air Conditioning Contractors of America, <http://www.acca.org>
7. Manual D, Residential Duct Systems, 3rd edition, published by the Air Conditioning Contractors of America, <http://www.acca.org>
8. Manual S, Residential Equipment Selection, published by the Air Conditioning Contractors of America, <http://www.acca.org>
9. Manual RS, Comfort, Air Quality, & Efficiency by Design, published by the Air Conditioning Contractors of America, <http://www.acca.org>
10. Manual T, Air Distribution Basics, published by the Air Conditioning Contractors of America, <http://www.acca.org>
11. Manual H, Heat Pump Systems, published by the Air Conditioning Contractors of America, <http://www.acca.org>
12. Manual G, Selection of Distribution Systems, published by the Air Conditioning Contractors of America, <http://www.acca.org>
13. ASHRAE Standard 62.2 Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings, published by the American Society of Heating, Refrigerating and Air-conditioning Engineers, Inc., <http://www.ashrae.org>
14. ASHRAE Standard 52.2 Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size, published by the American Society of Heating, Refrigerating and Air-conditioning Engineers, Inc., <http://www.ashrae.org>
15. ASTM Standard C1015-06 “Standard Practice for Installation of Cellulosic and Mineral Fiber Loose-Fill Thermal Insulation”, published by ASTM International, <http://www.astm.org>
16. ASTM Standard C1320-05 “Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction”, published by ASTM International, <http://www.astm.org>

17. ASTM Standard C727-01 (2007)e1 “Standard Practice for Installation and Use of Reflective Insulation in Building Constructions”, published by ASTM International, <http://www.astm.org>
18. ASTM Standard C1158-05 “Standard Practice for Installation and Use of Radiant Barrier Systems in Building Constructions”, published by ASTM International, <http://www.astm.org>
19. ASTM Standard E2112-07 “Standard Practice for Installation of Exterior Windows, Doors and Skylights”, published by ASTM International, <http://www.astm.org>
20. Flexible Duct Performance and Installation Standards 4th edition, published by the Air Diffusion Council, <http://www.flexibleduct.org>
21. Fibrous Glass Duct Construction Standards, 5th edition, published by the North American Insulation Manufacturers Association, <http://www.naima.org>
22. FTC Trade Regulation Rule 16 CRF 460, Labeling and Advertising of Home Insulation, published by the Federal Trade Commission, <http://www.ftc.gov>

804.3 Sample Work Scope Form

(This is informative and does not contain requirements necessary for conformance to these guidelines.)

Work Scope for _____

All work will be performed according to the following checked standards:

This work scope is not a list of recommendations that may be implemented independently; any exclusion to this scope may increase the risk of flue gas spillage, back-drafting, carbon monoxide production or moisture problems within the home.

What qualifications are required from contractors/technicians conducting the work:

What work needs to be performed:

Where the work needs to be performed:

How the work is to be performed (referenced Standard(s)):

Chapter 9- RESNET NATIONAL STANDARD FOR QUALITY ASSURANCE

903 Quality Assurance Requirements for QA Providers

903.4 Quality Assurance of Raters and Ratings

903.4.2 Quality assurance field review (QA field review).

903.4.2.4 Each home selected for a QA field review for each Rater shall be randomly selected from as many different builders and communities as possible. Special effort should be taken to make certain that the selected homes are as representative as possible of the homes being rated, i.e. new and existing homes,

geographic location, builder, trade contractor, variety of floor plans, etc., which, in some instances, may require more than the minimum (1) home or one percent (1%).

903.4.2.4.1 For multifamily projects, when selected, field QA shall include a comprehensive inspection of all minimum rated features that are possible to be inspected within the selected units and within the building during the time of the field QA. This means that the QAD shall inspect attic insulation via a common attic access where present, mechanical rooms that house common mechanical systems that serve multiple units, common ventilation systems, etc.

903.4.2.4.2 If the annual rating volume of a Rater is such that more than one field QA is required for that annual period's field QA quota (i.e. the Rater completed more than 100 ratings during the annual period), no more than one field QA within a particular multifamily development shall count toward meeting the total field QA quota.

903.4.2.4.2.1 An exception would be allowed if a particular multifamily development contained more than 100 units. In such an instance, one field QA per every 100 units of that development shall count towards the annual field QA quota.

903.4.2.4.2.2 Another exception would be allowed if the Rater had one or more Rating Field Inspectors (RFI) who worked with them throughout the annual period, in which case the QAD may select multiple units within a particular multifamily development to count towards the annual field QA quota for each RFI as long as those additional field QAs represent work performed by each individual RFI during the annual period.

903.4.2.4.2.3 If units within a multifamily building have multiple space conditioning configurations such that some units have ducts and other units do not, the QAD shall choose a unit with ducts for field QA. Alternatively, if the building has some units with ducts that are within Conditioned Space Volume while others have ducts that are within Unconditioned Space Volume, the QAD shall choose a unit with ducts that are within Unconditioned Space Volume for field QA.

Appendix A- ON-SITE INSPECTION PROCEDURES FOR MINIMUM RATED FEATURES

A-1 Building Element: Foundation

A-1.1 Rated Feature: Conditioning of space

A-1.1.1 Task: Determine whether a crawl space or basement is a Conditioned Space Volume or an Unconditioned Space Volume.

A-1.1.1.1 On-Site Inspection Protocol:

To determine whether a crawl space or basement is Conditioned Space Volume, assess whether it meets the definition of Conditioned Space Volume in Appendix B. To determine whether a crawl space or basement is Unconditioned Space Volume, assess whether it meets the definition of Unconditioned Space Volume in Appendix B.

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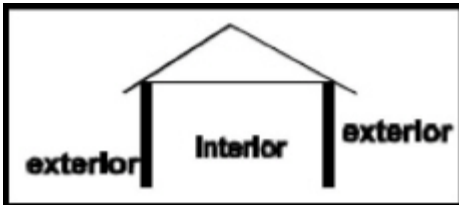
A-4 Building Element: Walls

A-4.6 Rated Feature: Location

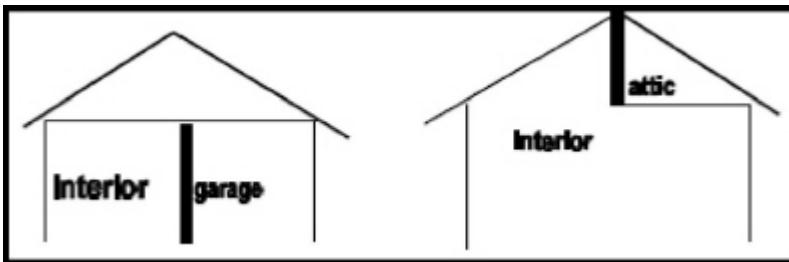
A-4.6.1 Task: Determine whether walls border exterior space, attic, garage or crawl space

A-4.6.1.1 On-Site Inspection Protocol:

Wall to exterior -Walls border exterior space.



Wall to enclosed Unconditioned Space Volume -Walls that border unconditioned attics, garages and crawl spaces.



A-4.7 Rated Feature: Surface area

A-4.7.1 Task: Determine surface area of all walls exposed to Unconditioned Space Volume

A-4.7.1.1 On-Site Inspection Protocol:

Measure linear perimeter of the walls to the nearest ½ foot. Measure the interior wall height of the walls to the nearest 1/4 foot. Use these measurements to calculate surface area.

A-4.8 Rated Feature: Thermal mass

A-4.8.1 Task: Determine type and thickness of all mass walls

A-4.8.1.1 On-Site Inspection Protocol:

If the dwelling's walls are constructed of concrete, masonry or brick, determine their type and thickness.

Solid concrete walls (poured): Measure the thickness of the poured concrete wall in inches.

Concrete Masonry Unit: Cinder block or uninsulated concrete wall - hollow in the middle. May contain vermiculite or perlite insulation. Check for additional insulation (interior furring, foam board, foam fill). Measure the thickness of the wall in inches.

A-5 Building Element: Roof/Ceiling

A-5.1 Rated Feature: All ceiling areas between Conditioned and Unconditioned Space Volumes

A-5.1.1 Task: Obtain measurements of all ceiling areas

A-9 Building Element: Air leakage

A-9.1 Rated Feature: Blower door test

A-9.1.1 Task: Determine effective leakage area from a blower door test

A-9.1.1.1 On-Site Inspection Protocol:

The testing protocol contained in ANSI/RESNET/ICC 380-2016 shall be used.

A-9.2 Rated Feature: Conditioned volume of space

A-9.2.1 Task: Determine conditioned volume of space

A-9.2.1.1 On-Site Inspection Protocol:

Determine Conditioned Space Volume and Unconditioned Space Volume using definitions in Appendix B. The house may need to be split into different spaces with different ceiling heights and added to each other. For areas with vaulted ceilings, volume must be calculated geometrically.

A-9.3 Rated Feature: Estimate

A-9.3.1 Task: If diagnostic equipment is not used, determine window type and distribution system to estimate leakage

A-9.3.1.1 On-Site Inspection Protocol:

To be determined.

A-9.4 Rated Feature: Tracer gas test

A-9.4.1 Task:

A-9.4.1.1 On-Site Inspection Protocol:

To be determined.

A-10 Building Element: Heating & Cooling/Distribution System

A-10.1 Rated Feature: Air leakage (ducts)

A-10.1.1 Task: Determine air leakage from ducts

A-10.1.1.1 On-Site Inspection Protocol:

The testing protocol contained in ANSI/RESNET/ICC 380-2016 shall be used.

A-10.2 Rated Feature: Insulation

A-10.2.1 Task: Determine the value of distribution system insulation

A-10.2.1.1 On-Site Inspection Protocol:

Air ducts may be insulated with insulation blankets or rigid insulation board. Inspect the duct or pipe insulation for R-value labeling (printed on the insulation by the manufacturer). If the insulation is not marked with the R-value, identify type and measure the thickness of the insulation to determine R-value. Check for internal insulation by tapping on the exterior and listening to the sound.

A-10.3 Rated Feature: Location of air ducts

A-10.3.1 Task: Determine the location of ducts

A-10.3.1.1 On-Site Inspection Protocol:

Air ducts may be located in the attic, crawl space, basement or in another Conditioned or Unconditioned Space Volume. You must locate and differentiate between supply and return ducts. Ducts may be located in more than one space.

A-13.7 Rated Feature: System type

A-13.7.1 Task: Determine type of solar systems

A-13.7.1.1 On-Site Inspection Protocol:

Identify whether a solar domestic hot water system exists. These systems collect and store solar thermal energy for domestic water heating applications. If a solar water heating system exists, determine system type. For systems manufactured after Jan. 1, 1995, system type, energy factor (EF), and other performance characteristics shall be determined from the SRCC label (usually affixed to the solar storage tank) and by referring to SRCC literature. For systems lacking an SRCC label, energy factor and other performance characteristics can be determined using a certified HERS modeling tool, or appropriate default values. Identify as passive or active. Base your evaluation on these criteria:

Passive - No purchased electrical energy is required for recirculating water through a passive solar collector. Three types of passive systems are integrated collector storage (ICS), thermosiphon systems and self-pumped systems.

Integrated Collector Storage (ICS) - consists of a single unit which incorporates both collector and water storage. An example is the common “bread box” design. Storage is usually outside the Conditioned Space Volume.

Thermosiphon - consists of a flat-plate solar collector and hot water storage tank. Instead of using a pump, circulation of the fluid is achieved by natural convection action. The storage tank must be located above the collector, and is usually outside the Conditioned Space Volume.

Self-pumped - circulates fluid from storage to collectors without purchased electrical energy. Photovoltaic and percolating systems are examples of self-pumped systems. The storage tank is usually inside the Conditioned Space Volume.

Active -Also known as pumped systems.

Pumped -purchased electrical energy input is required for operation of pumps or other components. The storage tank is usually inside the Conditioned Space Volume.

Appendix B- Glossary of Terms

Glossary of Terms

Air Exfiltration

Air from the Conditioned Space Volume leaking outside of the thermal boundary of a structure.

Air Infiltration

Air from outside the thermal boundary of a structure, which enters the Conditioned Space Volume.

Building Envelope

The components of a building (walls, ceilings, windows, doors, floors, and foundations) that separate the Conditioned Space Volume from the Unconditioned Space Volume or Conditioned Space Volume from outside.

Conditioned Floor Area (CFA)

The floor area of the Conditioned Space Volume within a building, minus the floor area of attics, floor cavities, crawlspaces, and basements below air sealed and insulated floors. The following specific spaces are addressed to ensure consistent application of this definition:

- The floor area of a wall cavity that is Conditioned Space Volume shall be included.
- The floor area of a basement shall only be included if the party conducting evaluations has either:
 - Obtained an ACCA Manual J, S, and either B or D report and verified that both the heating and cooling equipment and distribution system are designed to offset the entire design load of the volume, or,
 - Verified through visual inspection that both the heating and cooling equipment and distribution system serve the volume and, in the judgment of the party conducting evaluations, are capable of maintaining the heating and cooling temperatures specified by the Thermostat section in Table 4.2.2(1) of ANSI/RESNET/ICC 301-2104.
- The floor area of a garage shall be excluded, even when it is conditioned.
- The floor area of a thermally isolated sunroom shall be excluded.
- The floor area of an attic shall be excluded, even when it is Conditioned Space Volume.
- The floor area of a floor cavity shall be excluded, even when it is Conditioned Space Volume.
- The floor area of a crawlspace shall be excluded, even when it is Conditioned Space Volume.

Conditioned Space Volume

The volume within a building serviced by a space heating or cooling system designed to maintain space conditions at 78 °F (26 °C) for cooling and 68 °F (20 °C) for heating. The following specific spaces are addressed to ensure consistent application of this definition:

- If the volume both above and below a floor cavity meets this definition, then the volume of the floor cavity shall also be included. Otherwise the volume of the floor cavity shall be excluded.
- If the volume of one or both of the spaces horizontally adjacent to a wall cavity meets this definition, then the volume of the wall cavity shall also be included. Otherwise, the volume of the wall cavity shall be excluded.
- The volume of an attic that is not air sealed and insulated at the roof deck shall be excluded.
- The volume of a vented crawlspace shall be excluded.
- The volume of a garage shall be excluded, even when it is conditioned.
- The volume of a thermally isolated sunroom shall be excluded.
- The volume of an attic that is air sealed and insulated at the roof deck or an unvented crawlspace shall only be included if the party conducting evaluations has obtained an ACCA Manual J, S, and either B or D report and verified that both the heating and cooling equipment and distribution system are designed to offset the entire design load of the volume.
- The volume of a basement shall only be included if the party conducting evaluations has either:
 - Obtained an ACCA Manual J, S, and either B or D report and verified that both the heating and cooling equipment and distribution system are designed to offset the entire design load of the volume, or,
 - Verified through visual inspection that both the heating and cooling equipment and distribution system serve the volume and, in the judgment of the party conducting evaluations, are capable of maintaining the heating and cooling temperatures specified by the Thermostat section in Table 4.2.2(1) of ANSI/RESNET/ICC 301-2104.

Confirmed Rating

A Rating accomplished using data gathered from verification of all rated features of the home in accordance with [Chapter 3- National Home Energy Rating Technical Standards](#) and ANSI/RESNET/ICC 380-2016 (e.g., on-site visual inspections, on-site diagnostic test results or default values for envelope air leakage rates and distribution system efficiencies).

Infiltration Volume

The sum of the Conditioned Space Volume and Unconditioned Space Volume in the dwelling unit, minus the volume of:

- Floor cavities that have Unconditioned Space Volume both above and below,
- Unconditioned wall cavities,
- Attics,
- Vented Crawlspace,
- Garages,
- Basements, where the door between the basement and Conditioned Space Volume is closed during enclosure air leakage testing, and,
- Thermally isolated sunrooms.

Unconditioned Space Volume

The volume within a building that is not Conditioned Space Volume but which contains heat sources or sinks that influence the temperature of the area or room. The following specific spaces are addressed to ensure consistent application of this definition:

- The volume of a floor cavity shall be included, unless the volume both above and below the floor cavity meets the definition of Conditioned Space Volume.
- The volume of a wall cavity shall be included, unless the wall cavity meets the definition of Conditioned Space Volume.
- The volume of a vented attic 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 sealed and insulated at the roof deck, an unvented crawlspace, or a basement shall be included unless it meets the definition of Conditioned Space Volume.