

Reference Document for the Combustion Appliance Safety and Work Scope Exam

Background

This document is a clarification of combustion appliance safety and associated work scope recommendations (Sections 805-809 from Chapter 8 in the RESNET Mortgage Industry National Home Energy System Standard; August 3, 2011 revision). Combustion safety has become an increasingly critical part of the home energy retrofit industry due to the potentially life threatening risks involved. As a result of this safety concern, RESNET testing requirements include a traditional multiple choice exam (25 questions, 2 hours) and a new practical exam. There is one option for completing the practical exam, an internet based 3-D simulation exam.

HERS Raters in good standing who pass both testing components will become RESNET Comprehensive Home Energy Raters (CHERS). If CAZ and Work Scope candidates are not HERS Raters, successful completion of the requirements of this exam will result in the candidate attaining a standalone RESNET designation for combustion appliance safety and associated work scope. The passing grades are 80% for the multiple choice portion and 85% for the practical exam. Passing both the multiple choice exam and the practical exams is required for earning this certification.

Multiple Choice Examination

The multiple choice examination consists of 25 questions and a 2 hour time limit. More information can be found in the links below for Training Providers and Candidates.

Practical Field Exam

Field Examination via 3-D Interactive Simulation

The simulation exam will be delivered over the internet and proctored by a RESNET Training Provider. As part of the simulation exam fee (\$199), all candidates will receive complimentary access to a 1 month training simulation program called RESCAZ. More information can be found below.

[Click here if you are a Training Provider](#)

[Click here if you are a Candidate](#)

Standard Explanations

Combustion safety is a complex procedure that is constantly evolving. Below are expanded explanations of *six* points of the CAZ and Work Scope protocols. Important: these explanations are not a replacement of the standards. Consult the standards in conjunction with these explanations. Note: section numbers refer to Chapter 8 in the RESNET standards (revision date August 3, 2011).

Worst Case Depressurization

1. (807.5) For baseline setup, close all interior and exterior doors in the house. This baseline measurement protocol isolates the CAZ and assesses the impact of ambient factors such as wind, stack effect and temperature on the CAZ alone without interference from the rest of the house. Record the baseline CAZ pressure with respect to outside. Best practice recommends using the hose conduit on the blower door to access outside. Alternative methods such as cracking open windows or doors can impinge hoses, create faulty seals and affect pressure.
2. (807.8) Turn on all exhaust drivers within the house. To determine the worst case position of interior doors, measure the pressure of the room with respect to the main body of the house. Start with rooms/doors furthest away from the CAZ; test the CAZ door, if present, last. Close doors if they make the CAZ more positive or are the same pressure as the CAZ (0 Pa difference between the room and the rest of the house that is connected with the CAZ). Record the worst case pressure of the CAZ with respect to outside and note the door positions.
3. (807.9) An air handler (i.e. furnace fan) can significantly impact individual room pressures as well as the entire house. If an air handler is present, turn it on and redetermine the worst case position of interior doors for each room. Measure the pressure of the CAZ with respect to outside and compare this result to the worst case measurement without the air handler. For worst case, select the pressure that is more negative.
4. If more than one CAZ is present, repeat procedures for each zone separately. Remember to account for the impact of the combustion appliances on each other.

Carbon Monoxide (CO)

1. (808.4) Ambient Carbon Monoxide (CO) levels must be measured throughout testing, especially during Worst Case Appliance Testing. The largest source of ambient CO in a home is often the oven, a typically unvented combustion appliance. Once the oven has reached steady state, remember to measure ambient CO levels in common living areas such as the kitchen, family and dining rooms.

Work Scope

1. The result of combustion safety testing can lead to a variety of different work scope recommendations. The chart on the following page helps to organize those recommendations depending upon the combustion safety testing results.

Combustion Appliance Safety Work Scope Recommendation Table for Naturally Drafting Appliances (Category 1 or 2 according to NFPA standard 54)

Test Condition	Test Results				Work Scope Recommendation
	Worst Case		Natural Conditions		
	CO	Spillage	CO	Spillage	
1	PASS	PASS	N/A	N/A	No action required. Recommend replacement of atmospheric-vented combustion appliances with high-efficiency sealed combustion, direct vent, or power vented appliances when feasible.
2	PASS	FAIL	PASS	PASS	Recommend building pressure remediation, as applicable, and or equipment repair/replacement.
3	PASS	FAIL	PASS	FAIL	Recommend building pressure remediation, as applicable, and or equipment repair/replacement.
4	FAIL	PASS	PASS	PASS	Notify homeowner and recommend immediate equipment remediation and/or replacement.
5	FAIL	PASS	FAIL	PASS	Notify homeowner and recommend immediate equipment remediation and/or replacement.
6	FAIL	FAIL	PASS	PASS	Notify homeowner. Recommend immediate equipment remediation and/or replacement. Recommend building pressure remediation, as applicable.
7	FAIL	FAIL	PASS	FAIL	Notify homeowner. Recommend immediate equipment remediation and/or replacement. Recommend building pressure remediation, as applicable.
8	FAIL	FAIL	FAIL	PASS	Notify homeowner. Recommend immediate equipment remediation and/or replacement. Recommend building pressure remediation, as applicable.
9	FAIL	FAIL	FAIL	FAIL	Notify homeowner and recommend immediate equipment remediation and/or replacement.