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| Assessor Diagnostic Testing and Checklist |
|  File #\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  |  | Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  |  |

1. **Outdoor Temp**.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (Use this for minimum draft reading)
2. Location NG Meter or Propane Tank and Inlet\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Personal CO meter running when entering the home, turn Bacharach on outside for Calibration
4. **Ambient CO Reading** **Outside \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Inside\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
5. Health hazards identified\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. NG/Propane leaks outside □Yes □No Location of leak\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. Remove items from cook stove, communicate with client about the need to test cook stove
8. Gas leak behind cook stove □Yes □No Location\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
9. Turn cook stove on to reach steady state (5-10 minutes)
10. Inside gas leaks? □Yes □No Locations: 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 2.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_3.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 4.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date on gas lines\_\_\_\_\_\_\_\_ Condition\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
11. CAZ identified\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
12. All combustion appliances identified: A. \_\_\_\_\_\_\_\_\_\_\_\_\_\_B.\_\_\_\_\_\_\_\_\_\_\_\_\_C.\_\_\_\_\_\_\_\_\_\_\_\_\_D.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_E.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
13. Venting of combustion appliances acceptable □Yes □No Correction needed\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
14. Combustion air of appliances acceptable 2012 IRC □Yes □No Correction needed\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
15. **Kitchen Fan CFMs\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  Operable Window Y or N (Use for ASHRAE calculations) Ducting SWS compliant □Yes □No Correction Needed\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
16. **Bathroom Fan CFMs** 1. \_\_\_\_\_\_\_2.\_\_\_\_\_\_\_ Operable Window Y or N (Use for ASHRAE calculations) Ducting SWS compliant □Yes □No Correction needed\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
17. Thermostat condition and location\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Client education needed\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
18. Solid fuel heat source \_\_\_\_\_\_\_\_\_\_ashes cleaned, wrapped, vent damper closed, sealed\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
19. Wood stove or fire place up to code yes no Comment\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
20. **Cook stove CO Air Free and As Measured at least 300 degrees and after 5-10 minutes \_\_\_\_\_\_\_\_Burner observations:\_\_\_\_\_\_\_\_\_\_\_**
21. Continuously monitor ambient CO levels
22. Turn stove off; communicate to client about CO, usage, burner condition, items back in stove
23. Set up home for blower door and/or manometer for CAZ to outside baseline reading.
24. **Baseline reading after 1 minute and wind conditions observed \_\_\_\_\_\_\_\_\_**all windows closed, all fans off)
25. Watt meter on furnace, holes drilled using eye protection in plenums, all flues, all testing locations ready
26. Smoke stick/mirror ready for spillage, and manometers ready for static pressure and room to room tests
27. Thermometer ready for fan on temperature test
28. Thermostat turned on for furnace to kick on (if air handler fan cannot be turned on by itself)
29. Exhaust fans on pressure difference\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Comments\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
30. Dryer on pressure difference\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
31. (Simulate 300 CFM For Fireplace) If applicable
32. Possible to run air handler without furnace on? □Yes □No Air handler on pressure difference\_\_\_\_\_\_\_\_\_
33. Door closure of all bedrooms and CAZ \_\_\_\_\_ \_\_\_\_\_\_ \_\_\_\_\_\_ \_\_\_\_\_\_ \_\_\_\_\_\_ \_\_\_\_\_\_ \_\_\_\_\_\_ \_\_\_\_\_\_\_
34. House set up for worse case (describe)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
35. **Worse case reading**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Limit\_**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Pass □Yes □No

If worse case depressurization testing exceeds these limits, make up air must be provided or other modifications to the building shell or exhaust appliances must be included in the work scope to bring the depressurization within acceptable limits.

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| **Table 1: CAZ Limits (for reference)** |  |
| **Venting Conditions**  |   |   |   |   |   |   | Limit (Pa) |
| Orphan natural draft water heater (including outside chimneys) |   |   | -2 |
| Natural draft boiler or furnace commonly vented with water heater  |   |   | -3 |
| Natural draft boiler or furnace with damper commonly vented with water heater  |   | -5 |
| Induced draft boiler or furnace commonly vented with water heater  |   |   | -5 |
| Individual natural draft boiler or furnace , **or water heater** |   |   |   |   | -5 |
| Closed , controlled wood-burning appliances |  | -7 |
| Power vented or induced draft boiler or furnace alone, or fan assisted DWH alone |   | -15 |
| Pellet stove with exhaust fan and sealed vent | -15 |
| Direct vented appliances; Sealed combustion appliances forced draft; Chimney-top draft inducer  | -25 |

**Interim Gas/Propane Oven Testing Procedure**

These combustion appliances are capable of producing CO, which is a

health hazard. In all cases a carbon monoxide detector is recommended and homeowners

should use exhaust ventilation when using these appliances. *New appliances may require*

*an extended warm up period to reach steady state.*

1. Remove any items/foil in or on oven.

2. Make sure self-cleaning features are not activated, set oven to highest setting.

3. Test oven for CO in the flue, before dilution air.

4. After 5 to 10 minutes of operation, check for steady state:

**Level I Action - 100 ppm** as measured or **300ppm air free** you must

clean and tune prior to work. SWS 2.0201.2d

**Level II Action- >300ppm as measured** after servicing, exhaust ventilation must be provided with a capacity of 25 CFM continuous or 100 CFM intermittent.

**Check burners**

Specify clean and tune if the flame has any discoloration, flame impingement, or an irregular pattern or if burners are visibly dirty, corroded, or bent. SWS 2.0201.2e

**\*Continually monitor ambient CO levels during test.**

Monitor the ambient CO in the breathing zone during the test procedure and **abort the**

**test** if ambient CO goes over **35 ppm**. Turn off the appliance, ventilate the space, and evacuate the

building. The building may be reentered once ambient CO levels have gone below 35 ppm. The

appliance must be repaired and the problem corrected prior to completing the combustion safety

diagnostics. If the ambient levels exceed 35 ppm during testing under natural conditions, disable the

appliance and the appliance needs repair prior to operating it again.

1. **Fan on temperature**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(Between fan off and 130, not exceeding 140)
2. Dominant Duct Leakage Positive(return)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Negative(supply)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Five second rule Pass Fail
4. Furnace spillage? □Yes □No If yes then under natural conditions □Yes □No
5. **Static pressure** return\_\_\_\_\_\_\_ supply\_\_\_\_\_\_\_ Add together for **Total \_\_\_\_\_\_\_\_\_\_\_ Label\_\_\_\_\_\_\_\_\_\_\_\_\_**
6. Furnace Amperage \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. **Room to room balance tests: BR 1\_\_\_\_\_BR2\_\_\_\_\_ BR3\_\_\_\_\_ BR4\_\_\_\_ BATH1\_\_\_\_BATH2\_\_\_\_Other\_\_\_\_**
8. Return temperature\_\_\_\_\_ Supply temperature \_\_\_\_Supply minus return for **Temp rise\_\_\_\_\_ Label\_\_\_\_\_**
9. Stack temperature furnace\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Comments\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
10. **Draft reading after 5 mins\_\_\_\_ Minimum draft reading \_\_\_\_\_Pass? □Yes □No** Retest under natural\_\_\_\_
11. **CO Air Free and As Measured Reading Port 1\_\_\_\_\_ Port 2\_\_\_\_\_ Port 3\_\_\_\_ Port 4\_\_\_\_\_ Flue\_\_\_\_\_ Refer to CO action level chart**
12. **Furnace Steady State Efficiency \_\_\_\_\_\_\_\_\_\_AFUE\_\_\_\_\_\_\_\_\_\_\_ Model\_\_\_\_\_\_\_\_\_\_\_ Btuh Input\_\_\_\_\_\_\_\_**
13. Continuously monitor ambient CO levels
14. Gas pressure testing for fuel burning appliances (Be sure to delegate to your HVAC contractor)
15. Mark temperature setting and turn up water heater temperature. (Should be done before furnace if air handler can be turned on without furnace)
16. Spillage? □Yes □No If yes then under natural □Yes □No Five second Rule Pass Fail
17. Water heater **Draft** reading\_\_\_\_\_ **Minimum draft reading \_\_\_\_Pass? □Yes □No** Retest under natural\_\_\_\_

**Water heater model\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Btuh input\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. **CO Air Free and As Measured reading water heater \_\_\_\_\_\_\_\_\_\_ Port 1\_\_\_\_\_\_\_\_ Port 2\_\_\_\_\_\_\_\_ Refer to CO action level chart**
2. Continuously monitor ambient CO levels
3. Turn down water heater temperature to 120 or marked location and include client education. Water heater existing temperature\_\_\_\_\_\_\_\_\_\_ Client OK with 120? yes no If no, list temperature\_\_\_\_\_\_\_\_\_\_
4. Secondary Combustion Appliance Furnace/Wall Heater/Gravity/Unvented spillage yes no \_\_\_\_\_\_\_\_\_draft \_\_\_\_\_\_\_\_CO\_\_\_\_\_\_ \_\_ model\_\_\_\_\_\_\_\_\_\_\_ Btuh input\_\_\_\_\_\_\_\_\_\_\_\_
5. Secondary Combustion Appliance Furnace/Wall Heater/Gravity/Unvented/ spillage yes no \_\_\_\_\_\_\_\_\_draft \_\_\_\_\_\_\_\_CO\_\_\_\_\_\_ \_\_ model\_\_\_\_\_\_\_\_\_\_\_ Btuh input\_\_\_\_\_\_\_\_\_\_\_\_
6. Secondary Combustion Appliance Furnace/Wall Heater/Gravity/Unvented/ spillage yes no \_\_\_\_\_\_\_\_\_draft \_\_\_\_\_\_\_\_CO\_\_\_\_\_\_ \_\_ model\_\_\_\_\_\_\_\_\_\_\_ Btuh input\_\_\_\_\_\_\_\_\_\_\_\_
7. Secondary Combustion Appliance Furnace/Wall Heater/Gravity/Unvented/ spillage yes no \_\_\_\_\_\_\_\_\_draft \_\_\_\_\_\_\_\_CO\_\_\_\_\_\_\_\_ model\_\_\_\_\_\_\_\_\_\_\_ Btuh input\_\_\_\_\_\_\_\_\_\_\_\_
8. **Fan off temperature\_\_\_\_\_\_\_\_\_\_** (Between 95 and 100, not less than 80) Service needed? □Yes □No
9. **High limit switch test reading\_\_\_\_\_\_\_** Method to reach high limit **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Pass?** □Yes □No (If assessor chooses not to conduct this test, it must be communicated to HVAC contractor)
10. Home returned to winter (CAZ room closed, high temp caulk on flues, inside doors open, etc.)?
11. Blower door @ 25 pascals\_\_\_\_\_\_\_\_\_\_\_\_ Home checked for problems (wood burning, ceiling, etc. )
12. **Blower door @ 50 pascals \_\_\_\_\_\_\_\_\_\_\_** EQA inches (CFM50/10)\_\_\_\_\_\_\_\_\_\_\_ **Target\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
13. **Zone Pressure Diagnostics: Attic \_\_\_\_\_\_\_\_Crawl \_\_\_\_\_\_\_CAZ \_\_\_\_\_\_\_Garage \_\_\_\_\_\_\_\_Other \_\_\_\_\_\_\_\_**
14. Pressure Pan Readings: **Return\_\_\_\_\_\_Livingroom\_\_\_\_\_Kitchen\_\_\_\_\_\_\_Dining\_\_\_\_\_\_BR1\_\_\_\_\_\_BR2\_\_\_\_\_\_BR3\_\_\_\_\_BR4\_\_\_\_\_BATH1\_\_\_\_\_BATH2\_\_\_\_\_Other1\_\_\_\_\_\_\_Other2\_\_\_\_\_\_\_Other3\_\_\_\_\_\_\_\_Other4\_\_\_\_\_\_\_\_Other5\_\_\_\_\_\_**
15. Visible Duct Inspection\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
16. Turn off blower door. Double check to make sure all tests are complete
17. Check all pilots
18. Take down blower door and collect all tools, instruments, gauges
19. Be sure client education at time of assessment complies with all SWS requirements

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|  **Acceptable Draft Test Ranges** **Outside Temperature (F) Minimum Draft Pressure Standard (Pa)** |
| **Outside Temperature (degree F)** | **Minimum Draft Pressure Standard (Pa)** |
| <10 | -2.5 |
| 10-90 | (Outside temperature/ 40) – 2.75 |
| >90 | -0.5 |

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| **Combustion Safety Test Action Levels** |
| **Carbon Monoxide Result As Measured** | **And/Or** | **Spillage and Draft Test** | **Action** |
| **0 – 25 ppm** | *And* | **Passes** | Proceed with work |
| **26 – 100 ppm** | *And* | **Passes** | Recommend that the CO problem befixed |
| **26 – 100 ppm** | *And* | **Fails at worst case only** | Recommend a service call for theappliance and/or repairs to the hometo correct the problem |
| **100 – 400 ppm** | *Or* | **Fails under natural conditions** | Stop Work: Work may not proceeduntil the system is serviced and theproblem is corrected |
| **> 400 ppm** | *And* | **Passes** | Stop Work: Work may not proceeduntil the system is serviced and theproblem is corrected |
| **> 400 ppm** | *And* | **Fails under any condition** | Emergency: Shut off fuel to theappliance and have the homeowner tocall for service immediately |