



Department of Commerce
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Combustion Safety Test Report

Client		Date				
Address		Auditor & Inspector name <i>initials do not suffice</i>				

Pre-test: *START CO measurement (Monoxer) outside*

Combustion Appliance Zone (CAZ)		PRE	POST	PRE	POST
1	CAZ Pressure with reference to (WRT) outside "BASELINE"				
2	Outside wind speed				
3	Outside temperature				
4	Designate appliance(s):	Appliance name 1:		2:	
		Appliance location 1:		2:	
		Type of combustion open/closed 1:		2:	
		Type of draft natural/induced/forced 1:		2:	
		Shared venting yes/no 1:		2:	
	Vent Category Type I, II, III, IV 1:			2:	
5	Hazardous or unsafe conditions observed?	Y/N	Y/N	Y/N	Y/N
6	Visible signs of vent pipe leaks or damage observed?	Y/N	Y/N	Y/N	Y/N
7	Smell of gas or indication of fuel leak(s) observed?	Y/N	Y/N	Y/N	Y/N

Furnace on or off? Could be worst case either way, depending on duct leakage. on/off on/off on/off on/off

Set up CAZ in Worst Case Depressurization (see Exhibit 5.3.1B Tech Support Doc)		PRE	POST	PRE	POST
8	CAZ pressure WRT outside. Door open/closed (circle one) <small>Line 8 - Line 1</small>				
8a	Result of Line #8 minus Line #1 "baseline" = Worst Case Dep. <small>= (8a)</small>				
8b	Record CAZ Depressurization Limit: See Reference Tables				

Start up combustion appliance		PRE	POST	PRE	POST
9	Flame roll-out observed	Y/N	Y/N	Y/N	Y/N
10	Did the equipment spill gasses for more then 1 minute? If yes, STOP test. Let cool. Continue test in natural conditions.	Y/N	Y/N	Y/N	Y/N
11	Did the flame change when the air handler turned on?	Y/N/NA	Y/N/NA	Y/N/NA	Y/N/NA

After 5 minutes of combustion (steady state)		PRE	POST	PRE	POST
12	Measure ambient CO in the living space.				
13	Measure draft pressure in combustion appliance vent WRT CAZ				
13a	Record Minimum Acceptable Draft Pressures: See Reference Tables				
14	Measure CO in the exhaust gases of the vented appliance				
15	Measure draft pressure in the combustion appliance vent WRT CAZ (From line #8, if door is closed-open it. If door is open-close it) Door is open / close (circle one)				
16	Measure heat rise temperature across heat exchanger				
16a	Record manufacturer's acceptable heat rise range from label				

Fireplace/ Wood Stove Zone (FPWSZ)		PRE	POST	PRE	POST
17	Measure FPWSZ pressure WRT outside				
	Vent pipe, chimney, or clearance problems observed (note below)	Y/N	Y/N	Y/N	Y/N

Oven		PRE	POST	PRE	POST
18	Measure CO in the exhaust gases of the oven				
	Ambient 1				
	Ambient 2				

Return house to pretest conditions		PRE	POST	PRE	POST
19	Check box when done. Add any comments or notes below.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Notes:

COMBUSTION SAFETY TEST REPORT REFERENCE TABLES

Vent Categorization Per NFPA 54 (Line 4)	
<i>Category I NFGC</i>	<i>Category III Airtight</i>
Non-Condensing Negative Pressure (-) High Temperature Flue Gases Natural or Fan Assisted Drafts AFUE usually 65-83% Typical Materials: Single wall metal, B-Vent, Lined Masonry	Non-Condensing Positive Pressure (+) High Temperature Flue Gases Fan Assisted Draft AFUE usually 78-87% Typical Materials: Sealed metal or plastics per manufacturer
<i>Category II Corrosion Resistant</i>	<i>Category IV Airtight & Corrosion Resistant</i>
Condensing Negative Pressure (-) Low Temperature Flue Gases <<very little equipment in this category>> Typical Materials: Special as designated by manufacturer	Condensing Positive Pressure (+) Low Temperature Flue Gases Sealed Combustion AFUE usually 90% + Typical Materials: Sealed plastics per manufacturer specification

Venting Condition	Limit (Pa)
Stand alone natural draft water heater (including outside chimneys)	-5
Orphaned natural draft water heater	-2
Natural draft boiler or furnace vented in combination w/ water heater	-3
Natural draft boiler or furnace w/ vent damper commonly vented w/ water heater	-5
Induced draft boiler or furnace commonly vented w/ water heater	-5
Individual natural draft boiler or furnace	-5
Fireplace	-4
Wood stoves & fire place inserts, including air tight models w/ outside combustion air	-5
Power vented or induced draft boiler or furnace alone, also Pellet Stoves	-15
Chimney-top draft inducer; High static pressure flame retention head burner; Direct vented appliances; Sealed combustion appliances	-50

Temp (F)	Draft (Pa)
≤15	-2.4
20	-2.3
25	-2.1
30	-2.0
35	-1.9
40	-1.8
45	-1.6
50	-1.5
55	-1.4
60	-1.3
65	-1.1
70	-1.0
75	-0.9
80	-0.8
85	-0.6
≥ 90	-0.5

CO Test Result for undiluted flue gas at steady state	And/Or	Spillage and Draft Test Results	Retrofit Action
0 - 25 ppm	And	Passes	Proceed with work
26 - 100 ppm	And	Passes	Recommend that CO problem be fixed
26 - 100 ppm	And	Fails under Worst case only	Recommend a service call for the appliance. Correct problems causing combustion appliance to fail under worst case test
>100 - 400 ppm	Or	Fails under natural conditions	Stop Work: Work may not proceed until the system is serviced and the problem is corrected.
> 400 ppm	And	Passes	Stop Work: Work may not proceed until the system is serviced and the problem is corrected.
>400 ppm	And	Fails under any condition	Emergency: Shut off fuel to the appliance. Owner/Agency call for service immediately.

Depressurization Result - ACTION

The Local Agency shall perform a worst-case depressurization test in each combustion appliance zone.

When combustion appliance zone (CAZ) depressurization limits are exceeded under worst-case conditions, the depressurization shall be brought within acceptable limits as detailed in Table 4: CAZ Depressurization Limits (above)

Exception: If Local Agency is unable to meet CAZ Depressurization Limits or standards, the reasonable efforts attempted, the actions taken, and the education provided to the client shall be documented in the client file.

CO Test Result for undiluted flue gas	Retrofit Action
0 - 99 ppm	Proceed with work.
100 - 300 ppm	Recommend service.
>300 ppm	Unit must be serviced prior to Wx work.

Notes:

Link to Active Form: [Exhibit 5.S3A, Diagnostic Test Report](#)



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Diagnostic Test Report

0									
Client Name: _____									
0									
Address: _____									
Pre Blower Door:									
i.	Client Eligibility Date:								
ii.	Audit Date:								
iii.	Client Interview Performed?						Yes	No	
iv.	Pollution Source Survey Completed?						Yes	No	
v.	Contaminants present that would either prohibit blower door test completely or require pressurization test:								
vi.	Technician:								
vii.	Date:								
CALCULATIONS						Pre	In-Progress	Post	
1	Calculated total square footage of heated area								
2	Calculated volume of conditioned space								
BASELINE CONDITIONS & HOUSE TIGHTNESS - Blower door						Pre	In-Progress	Post	
3	Primary heat source fuel type (example: nat. gas, electric, propane, wood)								
4	Windspeed MPH								
5	Outside temperature °F								
6	Blower door location								
7	Baseline without blower door on in pa (stack effect)								
8	Blower door configuration: O=open fan A=ring A B=ring B LF= low flow ring								
9	Total CFM50								
10	ZONAL PRESSURES - Blower door						Pre	In-Progress	Post
	ATTIC	WRT house							
	CRAWLSPACE	WRT house							
	GARAGE	WRT house							
	OTHER:	WRT house							
	OTHER:	WRT house							
	OTHER:	WRT house							
11	Location of existing ducts: A=inside B=outside C=inside/outside								
12	12. Duct Pressure Test - Blower Door								
13	13. Room Pressure - HVAC fan only								
	Location	S/ Supply R/Return	Room WRT main body		Pressure Pan: House WRT Duct				
			Pre	Post	Pre	In Progress	Post		
a.									
b.									
c.									
d.									
e.									
f.									
g.									
h.									
i.									
j.									
k.									
l.									
TESTING AIRHANDLER (HVAC) EFFECTS: HVAC fan only						Pre	In-Progress	Post	
14	Dominant Duct Leak Test: Main Body WRT outside (all interior doors open)								
15	All Doors Closed Effect: Main Body WRT outside (all interior doors closed)								
16	Duct location after Wx and Repairs: A=inside B=outside C=inside/outside								
17	Electric furnace heat rise test (supply°F–return°F) acceptable range:>40°to<70°								
18	Return house to pre test conditions (Check box when done)						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NOTES/DOCUMENTATION:									

Diagnostic Test Report Quick Reference

Pressure Pan Tests

In typical mobile home duct configurations, pre pressure pan tests help locate areas of significant leakage or disconnected duct work. After belly is filled with insulation, post pressure pan tests results may not be useful.

In site built homes with supply and return duct systems enclosed entirely within the thermal and pressure boundaries, pressure pan tests are not required.

Dominant Duct Leak Test

In typical mobile home duct configurations, dominant duct leak tests are especially useful. You can quantify the amount of duct leakage by using the Air Leakage Chart (aka Tooley Chart) if the return is isolated in the conditioned space and the supplies are isolated in the belly. No more than 100CFM of total supply duct leakage is recommended.

In site built homes with supply and return duct systems enclosed entirely within the thermal and pressure boundaries, dominant duct leak tests are not required.

Air Leakage Chart

