

STATE OF UTAH WEATHERIZATION ASSISTANCE PROGRAM

Furnace Clean & Tune Procedures



1. Check all vent terminations from outside. Record any unusual conditions in the "Comments Section".
2. Introduction:
 - A. Tell the client who you are and that you will be working on the furnace, and that you will need access to the entire home.
 - B. Review file for all necessary signatures & utility account information.
 - C. Tell the client how long you will be in their home.
 - D. Explain that they must be present at the end of the work for client education
 - E. Remind the client that you will be making noise when drilling holes, cleaning, etc.
3. Ask the client if there are any furnace or comfort problems. Record in the "Comments Section".
4. Record the client's thermostat settings. Discuss energy savings potential of using a lower thermostat temperature setting.
5. Check for gas leaks (Tif88 or equivalent). If major leaks are found **STOP!** Move yourself and all occupants to the outside of the residence, call Dominion gas and your supervisor. **DO NOT operate any electrical switches inside the residence.** Repair any minor leaks as needed.
6. Check for asbestos; if you suspect asbestos **STOP!** Contact your supervisor.
7. Record furnace model & serial # (use Preston's guide or combustion analysis to determine efficiency)
8. Check gas shut off at furnace; it must be accessible and easily turned off by hand - if not replace. Check gas flex for damage or kinks, replace as needed. If gas flex passes through furnace cabinet or is located inside furnace cabinet, correct as needed.
9. Check venting system for clearances and damage, repair as needed and record.
10. Check for any other safety and/or code concerns; correct as needed and record.
11. Check for and record the source and amount of combustion air; if combustion air is not adequate correct as needed.
12. Pull burner heads and perform visual inspection of heat exchanger through burner openings; if evidence of heat exchanger cracks or excessive rust and carbon build up (plugged heat exchanger) are found, replace furnace.
13. Pull blower motor and housing and perform visual inspection of heat exchanger up through furnace. Use an inspection mirror and high intensity flashlight or see snake type camera to check the hidden areas. If heat exchanger cracks are found replace furnace. If furnace has secondary heat exchanger, record condition and clean as needed.
14. If possible inspect heat exchangers from the top side by cutting an access hole in the supply plenum. Use an inspection mirror and high intensity flashlight or see-snake type camera to check the hidden areas. If heat exchanger cracks are found replace furnace. **DO NOT cut holes in furnace cabinet or A/C coil cabinet to perform this inspection.**
15. Clean burner heads, blower wheel and housing (water is the best method for cleaning these items; eg: garden hose outside). **DO NOT!!! Clean blower motor with water;** use a dry towel and shop vac to clean blower motor. Use towel, shop vac and compressed air to clean the rest of the furnace. Inspect and clean flame sensor; use steel wool (silica type sand paper is not recommended) if flame sensor shows signs of damage eg: cracked or chipped ceramic - replace flame sensor.
16. If existing blower motor is a PSC motor evaluate for replacement with an ECM retrofit motor.
17. Inspect and clean condensate drain lines. Use a drain brush, compressed air or nitrogen. **DO NOT apply more than 50 psi of pressure to condensate drain lines.**
18. If furnace has A/C coil, inspect coil. Record condition and clean as needed.
19. Check all electrical connections, wires and fuses for loose connections bare or frayed wires, defective or improperly sized fuses. Check door safety switch and main power switch for proper operation; repair or replace as needed.
20. Check all pressure switch tubing for damage, rot and obstructions (pull tubing off and blow through it). Check pressure port nipples for obstructions. Repair or replace tubing as needed.
21. Check igniter Ohms; if over 100 Ohms replacement is recommended, unless manufacture specs otherwise.
22. Seal leaks in all accessible duct work with mastic.
23. Evaluate system for new programmable/set back thermostat if one does not already exist.
24. Install clean filter, ensure that filter access is user friendly; if filter is excessively difficult to change, make a reasonable effort to remedy the problem.
25. Check and record inlet gas pressure. (NOTE. if residence has many gas appliances check this while all other appliances are running). If inlet pressures are not within factory recommendations - 4.5"wc to 10"wc contact Dominion gas.
26. Drill holes in supply and return plenums (NOTE hole in supply plenum should be out of direct line of sight of the heat exchangers or above A/C coil if present) **CAUTION DO NOT drill holes in A/C coil.** Insert temperature probes into holes. On a mobile home furnace insert temperature probes in closest supply register and at the return air opening at furnace.

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- 27. Prepare exhaust vent for combustion analysis probe. PVC exhaust may be drilled if exhaust termination is not easily accessible; after analysis is complete, install a stainless steel or PVC plug with high temp RTV into test hole. Follow State issued best practices method for B-Vent exhaust.
- 28. Install manometer on manifold side of gas valve; call for heat at the thermostat. Making sure all other gas appliances and pilot lights are off, clock the meter and verify that the furnace is properly derated for altitude; correct deration if needed and document all results.
- 29. Furnace should have run for at least 5 minutes before taking the following readings. Check combustion analysis; combustion readings should fall within the following range: Oxygen = 6 to 12% Carbon dioxide = 6 to 9% Excess air 35 to 75%. CO levels in exhaust must be below 400 PPM air free and, preferably below 25 PPM air free if CO levels cannot be maintained at or below 400 PPM air free furnace replacement may be considered.
- 30. Ensure combustion analysis tape is placed in the client file
- 31. Check supply air stream at plenum and the registers for CO readings. If any CO is detected in the supply air stream, first verify that it is not being pulled into the system from an external source eg: back drafting water heater, return air grill in close proximity to operating gas cook top or fireplace. If it is determined that CO in the supply air stream is from the furnace, replace furnace.
- 32. Check and document the following: Inducer motor amp draw, Blower motor amp draw, Overall appliance amp draw measured at main power to furnace, and flame rectification. If any of these readings are not within factory specs, repair, replace or correct as needed and document.
- 33. Check temperature rise with blower door and filter in place (supply air temp. minus return air temp. = temp. rise). If temperature rise is not within factory specs- generally 35° to 75° correct as needed. Temperature rise can be adjusted by slowing down (raises temp) or speeding up (lowers temp) the blower motor. Adjusting gas pressure to change temperature rise should be a last resort as gas pressure should be set for deration factors. If you are unable to obtain a satisfactory temperature rise, you will need to check the static pressure of the duct system; if static pressure is not within factory recommendations, attempt to correct as needed. This may include replacing the furnace with a smaller BTU input furnace. A heat load calculation must be performed to ensure proper equipment sizing.
- 34. End call for heat at thermostat; measure and document supply air temperature when blower shuts off. If temperature is above 90° adjust fan off time to get final fan off temperature as close to 90° as possible. If client does not complain about cold air out of registers at the end of heating cycle, you may set the fan off temperature lower than 90°
- 35. Remove filter and install return air block off plate; eg: filter covered with sheet metal or cloth or plywood cut to filter size. Insert temperature probe into high temperature limit housing, document high limit cut out temperature, start furnace and verify that the burners turn off at the high limit documented setting. (NOTE blower motor and inducer motor should continue to operate while burners are off). Verify that high limit cut out temperature coincides with furnace data plate recommended maximum temperature. If required replace high limit switch with proper limit switch. **NEVER at any time should you allow temperatures inside the furnace to exceed 275°.**
- 36. Seal all test and access holes in duct work. Install all furnace doors and electrical covers and make sure clean filter is in furnace.
- 37. If any atmospheric draft appliances exist in the home perform a CAZ worst case draft test.
- 38. Go through client education check sheet with the client, making absolutely certain that the client fully understands and signs the sheet. Leave spare filters with client.

COMMENTS: _____
