State of Ohio Weatherization Program Standards	Section	MECHANICAL SYSTEMS INSTALLATION
	Subject	Domestic Hot Water

FUEL SUPPLY 301-4.1

Repair leaks in the fuel supply lines. Replacement fuel lines shall be in accordance with the applicable NFPA material code for the fuel type being serviced.

fuel leaks
301-4.1a

Change, clean or add fuel filters in oil-fired systems.

fuel filters, oil
301-4.1b

Replace the oil nozzle in oil fired DHW systems according to the size on the data plate. Readjust or replace and adjust the electrodes.

oil nozzle & electrodes
301-4.1c

Use a manometer to check the manifold gas pressure and adjust according to manufacturer's instructions. If unable to locate manufacturer's recommended pressures, it is possible to use 11" water column for LP/propane and 3.25-3.75" water column inches for natural gas. Set oil pump pressure to PMI. With oil burners it is too important to give a range.

gas/oil pressure
301-4.1d

Adjust the gas pressure if the DHW tank is under- or over-fired. Replace the orifice in a propane or natural gas system with the proper sized orifice, if necessary.

gas orifices
301-4.1e

ELECTRICAL POWER SUPPLY 301-4.2

Repair or replace the main electrical power supply to an electric tank if it is unsafe.

main power supply
301-4.2a

Install a properly sized and fused, dedicated circuit for the DHW if one is necessary based on wire condition, a history of circuit failure, or if a new unit is to be installed.

dedicated circuit
301-4.2b

Replace any wiring in or connected to the heating unit that is charred, frayed, or has damaged insulation. Correct loose or improper wiring connections. Repair or replace defective wiring in, or leading to, the unit in accordance with NFPA 70, the National Electric Code.

hazardous wiring
301-4.2c

DHW UNIT CLEARANCES 301-4.3

unit clearances
301-4.3a

If the combustion-type DHW tank is not located with the required clearance from combustible materials according to the appropriate NFPA code or PMI, move it to achieve the required distance.

VENT SYSTEM INTEGRITY 301-4.4

damaged/corroded
301-4.4a

Repair or replace sections of the venting system that are corroded, rusted, clogged or blocked, contain cracks or holes, or are unsealed, loose or disconnected, in accordance with the applicable NFPA code for the fuel type (#54 gas, #31 for fuel oil, #211 for solid fuel).

vent connections
301-4.4b

Securely fasten all vent to chimney connections.

vent slope
301-4.4c

Repair or replace any vent connector pipe that dips or sags, or does not have a rise of at least 1/4" per foot of run.

vent elbows
301-4.4d

Repair or replace any vent system parts necessary so that it does not exceed the allowable number of elbows in the vent system. Refer to the venting codes listed in Table 301-4.4.

chimney condition
301-4.4e

If the chimney is the vent stack for the DHW tank, and it is not in sound condition, it must be repaired, lined with a new liner, or replaced with an approved double walled-metal, vent pipe, as specified by codes listed in Table 301-4.4.

DRAFT 301-4.5

draft problems
301-4.5a

Correct any vent or combustion appliance zone pressure problem that prevents the proper draft from a combustion DHW tank. Refer to Figure 301-4.5 for proper location for draft testing sites and Table 301-4.5 for acceptable draft measurements.

Figure 301-4.5 Draft Test Probe Placement

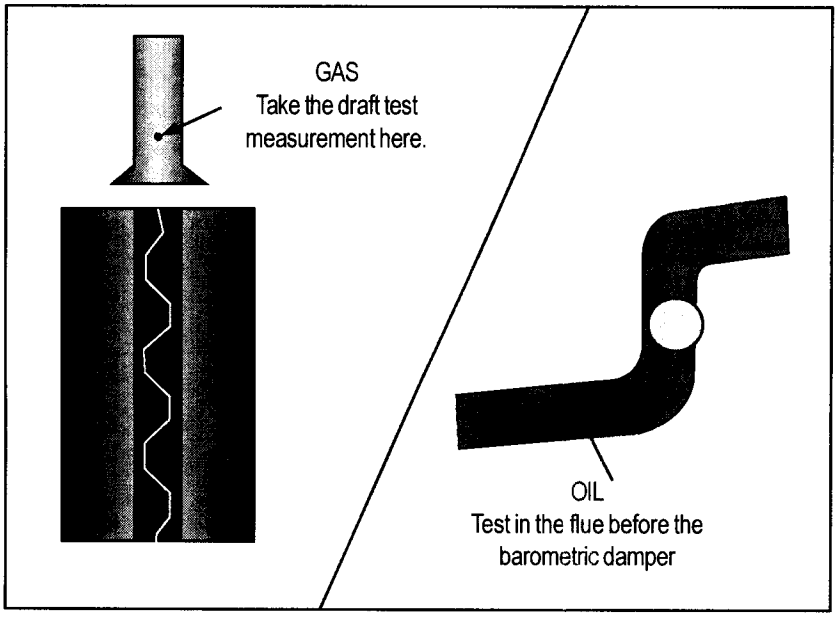

Table 301-4.5a Draft Test Locations and Acceptable Reading

Heating Unit Type	**Draft Gauge Probe Placement**	**Worst Case Acceptable Draft Readings at Listed Outdoor Temperatures (F)**				
		<20	21-40	41-69	61-80	>80
Gas Atmospheric Appliances (Furnace, Space Heater, Boiler Floor Furnace)	Flue (after diverter)	-5 Pa -.02 wc'	-4 Pa -.016 wc"	-3 Pa -.012 wc'	-2 Pa -.008 wc"	-1 Pa -.004 wc"
Gas Fan-Assisted	Flue (1 1/2 times the diameter of the flue from the flue collar or elbow)	-5 Pa -.02 wc'	-4 Pa -.016 wc"	-3 Pa -.012 wc'	-2 Pa -.008 wc"	-1 Pa -.004 wc"
Oil Burners	Flue (before Barometric Damper)	-15 Pa -.06 wc'	-13 Pa -.053 wc"	-11 Pa -.045 wc'	-9 Pa -.038 wc"	-7 Pa -.03 wc"
Gas 90+ Furnace	Exhaust Pipe	PMI	PMI	PMI	PMI	PMI

COMBUSTION SAFETY & EFFICIENCY 301-4.6

CO abatement
301-4.6a

Clean, repair, or adjust the DHW burner and fire tube to reduce CO amounts if the levels are higher than 100 ppm, as measured according to Figure 301-4.6.

O2 and stack temperature
301-4.6b

Clean, repair, or adjust the DHW burner and fire tube if the O_2 and the net stack temperature readings are not within the acceptable limits listed in Table 301-4.6b.

Table 301-4.6b Acceptable Combustion Test Analysis Measurements

DHW Unit Type	(O_2) Oxygen	Stack Temp.	Smoke Test	(CO) Carbon Monoxide Max. ppm
GAS (Natural Gas, Propane) Atmospheric	4-9%	300-600° F	N/A	100
Fan-assisted	4-9%	300-480° F	N/A	100
OIL Standard Oil Burner	4-9%	325-600° F	1 or less	100
Flame Retention	4-7%	325-600° F	1 or less	100

combustion air
301-4.6c

Add combustion air if the combustion air requirements are not in accordance with the applicable NFPA codes for the fuel type (#54 for gas, #31 for fuel oil, #211 for solid fuel). If the requirements are met, and carbon deposits and corrosion exist around the draft diverter, recheck for proper venting and backdrafting potential.

WATER TANK CONDITION 301-4.7

tank leakage
301-4.7a

Replace the tank if it is leaking. It may be replaced using HWAP Health and Safety funds.

pressure relief valve/ discharge pipe
301-4.7b

If the pressure relief valve and/or the discharge pipe is not present and there is an existing location for them, install them. If the relief valve and/or discharge pipe are not present and there is no existing location for them, install them in the hot water line.

Wrap the tank with DHW tank wrap, unless there is a written warning on the tank stating not to insulate. Do not wrap the tank if there is no pressure relief valve and no way to install one.

tank insulation
301-4.7c

If called for in the job order, lower the temperature setting on the DHW.

temperature setting
301-4.7d

If flame roll-out is occurring, clean and tune the DHW, and retest.

flame roll-out
301-4.7e

Replace the gas valve if it is not functioning properly.

gas valve
301-4.7f

Replace the thermostat if it is not operating properly.

thermostat
301-4.7g

DHW DISTRIBUTION 301-4.8

If water lines are leaking, inform the customer and repair the leaks.

water line leaks
301-4.8a

Insulate the first six feet of the hot and cold water lines with foam pipe wrap.

water line insulation
301-4.8b

NOTE: Keep the insulation at a safe clearance from gas or oil vent pipes, if the pipes are near the water lines. Refer to Table 301-4.4 for NFPA Venting Codes.

Repair hot water fixture leaks. If cold water fixtures are leaking, inform the customer, and repair cold water fixture leaks that may contribute to moisture problems.

water fixture leaks
301-4.8c

CEE

Install appropriate low-flow devices if the customer has agreed.

low flow devices
301-4.8d

CEE