

## Project ReEnergize Performance Testing

### Depressurization Testing Protocol

Version 1.0  
October 1, 2009

### Contractor Requirements

Project ReEnergize Performance Testing contractors are responsible for ensuring the quality of their work. The contractor must perform the work in a workmanlike manner in compliance with all applicable federal, state, and local codes, rules, regulations, statutes and ordinances. It is the contractor's responsibility to make a determination and be informed as to best practices within the contractors industry as well as the applicable legal requirements that must be adhered to.

### General Safety Guidelines

If at any time the smell of natural gas is detected, alert any occupants and crew members, leave the property immediately. Do not use a telephone in the house. Once outside, contact the local gas utility to report a gas leak. Do not re-enter the home until utility or public safety personnel determine it is safe.

### Depressurization Test Steps

This protocol is based on the 2000 Minnesota State Building Code, Residential Energy Code, Chapter 7672.0900, Subp 8. Protection Against Depressurization, (D) Performance Path Option.

#### **Step #1: Perform an initial walk through to identify combustion equipment**

Begin house 'walk through' in the mechanical room. Determine if water heater and space heating equipment and fireplaces require a depressurization test by identifying what type of equipment is being used in the home.

Use the following five tables to determine if a depressurization test is required according to the Project ReEnergize protocols. If a depressurization test is not required for the water heating and space heating equipment, skip to Step# 2.

Using Tables A-D choose the correct table by identifying the type of water heater in the home.

Table A. Electric water heaters, various space heating systems

Type of water heater	How is water heater vented?	Perform depressurization test on water heater?	Type of heating system	How is heating system vented?	Perform depressurization test on heating system?
Electric	No venting system	NO	Atmospherically Vented also called Natural Draft	B-vent (metal)	YES
			Power Vented	One pipe	YES
			Direct Vented also called Sealed Combustion	Two pipes (PVC or other material)	NO
			Electric Baseboard or other Electric heat	No venting system	NO
			Heat Pump: Ground or Air Sourced	No venting system	NO
			Any other system, see venting system on next column	Depends on venting system	MAYBE

Table B. Atmospherically water heaters, various space heating systems

Type of water heater	How is water heater vented?	Perform depressurization test on water heater?	Type of heating system	How is heating system vented?	Perform depressurization test on heating system?
Atmospherically Vented	B-vent (metal)	YES	Atmospherically Vented also called Natural Draft	B-vent (metal)	YES
			Power Vented	One pipe	YES
			Direct Vented also called Sealed Combustion	Two PVC pipes	NO
			Electric Baseboard or other Electric heat	No venting system	NO
			Heat Pump: Ground or Air Sourced	No venting system	NO
			Any other system, see venting system on next column	Depends on venting system	MAYBE

Table C. Power vented water heaters, various space heating systems

Type of water heater	How is water heater vented?	Perform depressurization test on water heater?	Type of heating system	How is heating system vented?	Perform depressurization test?
Power Vented	One pipe	YES	Atmospherically Vented also called Natural Draft	B-vent (metal)	YES
			Power Vented	One pipe	YES
			Direct Vented also called Sealed Combustion	Two pipes (PVC or other material)	NO
			Electric Baseboard or other Electric heat	No venting system	NO
			Heat Pump: Ground or Air Sourced	No venting system	NO
			Any other system, see venting system on next column	Depends on venting system	MAYBE

Table D. Direct vented/sealed combustion water heaters, various space heating systems

Type of water heater	How is water heater vented?	Perform depressurization test on water heater?	Type of heating system	How is heating system vented?	Perform depressurization test?
Direct Vented also called Sealed Combustion	Two pipes (PVC or other material)	YES	Atmospherically Vented also called Natural Draft	B-vent (metal)	YES
			Power Vented	One pipe	YES
			Direct Vented also called Sealed Combustion	Two pipes (PVC or other material)	NO
			Electric Baseboard or other Electric heat	No venting system	NO
			Heat Pump: Ground or Air Sourced	No venting system	NO
			Any other system, see venting system on next column	Depends on venting system	MAYBE

**Step # 2: Determine if a combustion test is needed for any wood burning or other solid fuel appliances.**

Table E. Fireplaces, wood burning stoves and other solid fuel combustion devices

Type of fireplace, wood burning stove or other solid fuel combustion device	How is system vented?	Perform depressurization test?
Electric	Unvented	NO
“Decorative” wood burning appliance [fire place or wood stove]	Flue	YES
Closed controlled combustion wood burning appliance [fire place or wood stove]	Flue	YES
Thermal mass wood-burning appliance	Flue	YES
Gas insert atmospherically vented	Flue	YES
Gas insert sealed combustion/direct vent	Concentric vent hood	NO

### Step #3 Prepare building for depressurization test if protocol requires one.

Perform Step# 4 at the same time by identifying types of fans during your test set up.

Table D. Depressurization Test Set-Up

Check-list	Description	Action
	Turn off heating system	Dial back thermostat
	Turn furnace blower off	Use control to turn off
	Turn off water heater	Turn water heater temperature all the way down or turn power off
	Seal furnace combustion air intake (one hole)	Duct tape If two holes are in mechanical room only plug one
	Locate mechanical ventilation system (existing air to air exchanger or new bathroom fan, probably in highest floor of home)	Set to normal operation
	Locate any floor drains and plumbing traps and fill	Fill with a cup of water
	Close door to mechanical room, if present	Close door
	Open all interior doors.	Open interior doors.
	Close all windows and exterior doors.	Close windows and exterior doors.
	Turn off clothes dryer	Use control to turn off
	Turn off all kitchen, bath and other fans that are not used for mechanical ventilation	Use controls to turn off
	Close fireplace flue(s) and fireplace/woodburning stove doors	Manually close flue and fireplace/woodburning stove doors
	Close attic hatch or door to attic	Close hatch or door

## Step #4 Identify fans and other exhaust systems in the house

Table E. First, Second and Third Largest Fans

Type of fan	Check if this is present in the house	Assign with fan #1, #2 & #3 from largest to smallest
Kitchen fan/vent hood (only if exhausted outside)		
Downdraft kitchen vent		
Clothes dryer		
Central vacuum system		
Largest bath fan		
2 <sup>nd</sup> largest bath fan		
Other, describe:		

## Step #5 Record base pressure

- Set up digital manometer near exterior door on main floor
- Place reference hose to outside with reference to (WRT)
- Place input hose to combustion appliance zone (CAZ)
- Record base pressure

## Step #6 Test and record pressure for 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> largest fans

- Turn on air handler (AC or furnace) if present, using the thermostat “fan on” switch (usually this is the opposite of “auto” mode if it’s not marked). Leave on for remainder of test.
- Record reading on digital manometer
- Turn on 1<sup>st</sup> largest exhausting device
- Record reading on digital manometer
- Use smoke bottle to check for spillage on combustion appliances (water heater, furnace/boiler, fireplace, wood stove for all that need to be tested according to this protocol)
- Record if any combustion appliances back drafted under this pressure reading.
- Look for blockage in flue or pipe
- Turn on 2<sup>nd</sup> largest exhausting device
- Record reading on digital manometer
- Use smoke bottle to check for spillage on combustion appliances (water heater, furnace/boiler, fireplace, wood stove for all that need to be tested according to this protocol)
- Record if any combustion appliances back drafted under this pressure reading.
- Look for blockage in flue or pipe
- Turn on 3<sup>rd</sup> largest exhausting device

### Step # 6 Test and record pressure for 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> largest fans (cont.)

- ❑ Record reading on digital manometer
- ❑ Use smoke bottle to check for spillage on combustion appliances (water heater, furnace/boiler, fireplace, wood stove for all that need to be tested according to this protocol)
- ❑ Look for blockage in flue or pipe
- ❑ Record if any combustion appliances back drafted under this pressure reading.
- ❑ Turn on water heater and furnace or boiler and let run for at least 4 minutes.
- ❑ Use smoke bottle to check for spillage on combustion appliances (water heater, furnace/boiler, fireplace, wood stove for all that need to be tested according to this protocol)
- ❑ If water heater or furnace/boiler is back drafting turn it off immediately after recording the pressure from the digital manometer. Failure to do this may cause dangerous levels of carbon monoxide to accumulate quickly.

### Step #7 Return house to its original settings.

Table F. House Original Settings

Check-list	Description	Action
	Turn on heating system	Dial back thermostat, if applicable
	Turn furnace blower off	Use control to turn off, if applicable
	Turn on water heater	Turn water heater temperature all the way down or turn power off
	Unseal furnace combustion air intake (one hole)	Make sure hole is fully open
	Open fireplace flue(s) and fireplace/woodburning stove doors	Manually open flue and fireplace/woodburning stove doors if they were originally opened

### Step #8 Record results on Performance Testing Results Form and send to contractor.

If back drafting occurred on any equipment or devices tested call Project ReEnergize contractor to verbally report test results. Send complete Performance Testing Results Form to contractor.