### Small Business Furnace Tune-Up

**Description**

This measure is for a natural gas Small Business furnace that provides space heating. The tune-up will improve furnace performance by inspecting, cleaning and adjusting the furnace and appurtenances for correct and efficient operation. Additional savings maybe realized through a complete system tune-up.

This measure was developed to be applicable to the following program types: Small business.

If applied to other program types, the measure savings should be verified.

**Definition of Efficient Equipment**

To qualify for this measure an approved technician must complete the tune-up requirements[[1]](#footnote-1) listed below:

* Measure combustion efficiency using an electronic flue gas analyzer
* Check and clean blower assembly and components per manufacturer’s recommendations
* Where applicable Lubricate motor and inspect and replace fan belt if required
* Inspect for gas leaks
* Clean burner per manufacturer’s recommendations and adjust as needed
* Check ignition system and safety systems and clean and adjust as needed
* Check and clean heat exchanger per manufacturer’s recommendations
* Inspect exhaust/flue for proper attachment and operation
* Inspect control box, wiring and controls for proper connections and performance
* Check air filter and clean or replace per manufacturer’s
* Inspect duct work connected to furnace for leaks or blockages
* Measure temperature rise and adjust flow as needed
* Check for correct line and load volts/amps
* Check thermostat operation is per manufacturer’s recommendations (if adjustments made, refer to ‘Small Commercial Programmable Thermostat Adjustment’ measure for savings estimate)
* Perform Carbon Monoxide test and adjust heating system until results are within standard industry acceptable limits

**Definition of Baseline Equipment**

The baseline is furnace assumed not to have had a tune-up in the past 2 years.

**Deemed Lifetime of Efficient Equipment**

The measure life for the tune up is 2 years.[[2]](#footnote-2)

**Deemed Measure Cost**

The incremental cost for this measure should be the actual cost of tune up.

**Deemed O&M Cost Adjustments**

There are no expected O&M savings associated with this measure.

**Loadshape**

Loadshape C04 - Commercial Electric Heating

**Coincidence Factor**

N/A

**Algorithms**

**Calculation of Energy Savings**

**Electric Energy Savings**

ΔkWh = ΔTherms \* Fe \* 29.3

Where:

ΔTherms = as calculated below

Fe = Furnace Fan energy consumption as a percentage of annual fuel consumption

= 3.14%[[3]](#footnote-3)

29.3 = kWh per therm

**Summer Coincident Peak Demand Savings**

N/A

**Natural Gas Savings**

Δtherms = (Capacity \* EFLH \* (((Effbefore + Ei)/ Effbefore) – 1)) / 100,000

Where:

Capacity = Furnace gas input size (Btu/hr)

= Actual

EFLH       = Equivalent Full Load Hours for heating are provided in section 4.4 HVAC End Use

Effbefore = Efficiency of the furnace before the tune-up

= Actual

*Note: Contractors should select a mid-level firing rate that appropriately represents the average building operating condition over the course of the heating season and take readings at a consistent firing rate for pre and post tune-up.*

EI             = Efficiency Improvement of the furnace tune-up measure

= Actual

100,000 = Converts Btu to therms

**Example**

A 200 kBtu furnace in a Rockford low rise office records an efficiency prior to tune up of 82% AFUE and a 1.8% improvement in efficiency are tune up:

Δtherms = (200,000 \* 1428 \* (((0.82 + 0.018)/ 0.82) – 1)) /100,000

= 62.3 therms

**Water Impact Descriptions and Calculation**

N/A

**Deemed O&M Cost Adjustment Calculation**

N/A

**O&M Cost Adjustment Calculation**

N/A

**Measure Code: CI-HVC-FTUN-V02-160601**

1. American Standard Maintenance for Indoor Units: http://www.americanstandardair.com/owner-support/maintenance.html [↑](#footnote-ref-1)
2. Act on Energy Commercial Technical Reference Manual No. 2010-4, 9.2.3 Gas Forced-Air Furnace Tune-up. [↑](#footnote-ref-2)
3. Fe is not one of the AHRI certified ratings provided for residential furnaces, but can be reasonably estimated from a calculation based on the certified values for fuel energy (Ef in MMBtu/yr) and Eae (kWh/yr). An average of a 300 record sample (non-random) out of 1495 was 3.14%. This is, appropriately, ~50% greater than the Energy Star version 3 criteria for 2% Fe. See “Programmable Thermostats Furnace Fan Analysis.xlsx” for reference. [↑](#footnote-ref-3)