### Process Boiler Tune-up

**Description**

This measure is for a non-residential boiler for process loads. For space heating, see measure 4.4.2. The tune-up will improve boiler efficiency by cleaning and/or inspecting burners, combustion chamber, and burner nozzles. Adjust air flow and reduce excessive stack temperatures, adjust burner and gas input. Check venting, safety controls, and adequacy of combustion air intake. Combustion efficiency should be measured before and after tune-up using an electronic flue gas analyzer.

**Definition of Efficient Equipment**

To qualify for this measure the facility must, as applicable, complete the tune-up requirements[[1]](#footnote-1) by approved technician, as specified below:

* Measure combustion efficiency using an electronic flue gas analyzer
* Adjust airflow and reduce excessive stack temperatures
* Adjust burner and gas input, manual or motorized draft control
* Check for proper venting
* Complete visual inspection of system piping and insulation
* Check safety controls
* Check adequacy of combustion air intake
* Clean fireside surfaces
* Inspect all refractory. Patch and wash coat as required.
* Inspect gaskets on front and rear doors and replace as necessary.
* Seal and close front and rear doors properly.
* Clean low and auxiliary low water cut-off controls, then re-install using new gaskets.
* Clean plugs in control piping.
* Remove all hand hole and man hole plates. Flush boiler with water to remove loose scale and sediment.
* Replace all hand hole and man hole plates with new gaskets.
* Open feedwater tank manway, inspect and clean as required. Replace manway plate with new gasket.
* Clean burner and burner pilot.
* Check pilot electrode and adjust or replace.
* Clean air damper and blower assembly.
* Clean motor starter contacts and check operation.
* Make necessary adjustments to burner for proper combustion.
* Perform all flame safeguard and safety trip checks.
* Check all hand hole plates and man hole plates for leaks at normal operating temperatures and pressures.
* Troubleshoot any boiler system problems as reQuested by on-site personnel

**Definition of Baseline Equipment**

The baseline condition of this measure is a boiler that has not had a tune-up within the past 36 months

**Deemed Lifetime of Efficient Equipment**

The life of this measure is 3 years[[2]](#footnote-2)

**Deemed Measure Cost**

The cost of this measure is $0.83/MBtu/hr[[3]](#footnote-3) per tune-up

**Deemed O&M Cost Adjustments**

N/A

**Loadshape**

N/A

**Coincidence Factor**

N/A

**Algorithm**

**Calculation of Energy Savings**

**Electric Energy Savings**

N/A

**Summer Coincident Peak Demand Savings**

N/A

**Natural Gas Energy Savings**

Δtherms=((Ngi \* 8766\*UF)/100) \* (1- (Effpre/Effmeasured))

Where:

Ngi = Boiler gas input size (kBtu/hr)

= custom

UF = Utilization Factor

= 41.9%[[4]](#footnote-4) or custom

Effpre = Boiler Combustion Efficiency Before 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.*

Effmeasured = Boiler Combustion Efficiency After Tune-Up

= Actual

100 =converstion from kBtu to therms

8766 = hours a year

EXAMPLE

For example, a 80% 1050 kBtu boiler is tuned-up resulting in final efficiency of 81.3%:

Δtherms =((1050 \* 8766\*0.419)/100) \* (1- (0.80/0.813))

= 617 therms

**Summer Coincident Peak Demand Savings**

N/A

**Water Impact Descriptions and Calculation**

N/A

**Deemed O&M Cost Adjustment Calculation**

N/A

**Measure Code: CI-HVC-PBTU-V05-160601**

1. Act on Energy Commercial Technical Reference Manual No. 2010-4, 9.2.2 Gas Boiler Tune-up [↑](#footnote-ref-1)
2. Act on Energy Commercial Technical Reference Manual No. 2010-4, 9.2.2 Gas Boiler Tune-up [↑](#footnote-ref-2)
3. Work Paper – Tune up for Boilers serving Space Heating and Process Load by Resource Solutions Group, January 2012 [↑](#footnote-ref-3)
4. Work Paper – Tune up for Boilers serving Space Heating and Process Load by Resource Solutions Group, January 2012 [↑](#footnote-ref-4)