

NORA/NYSERDA Tankless Coil Project Findings

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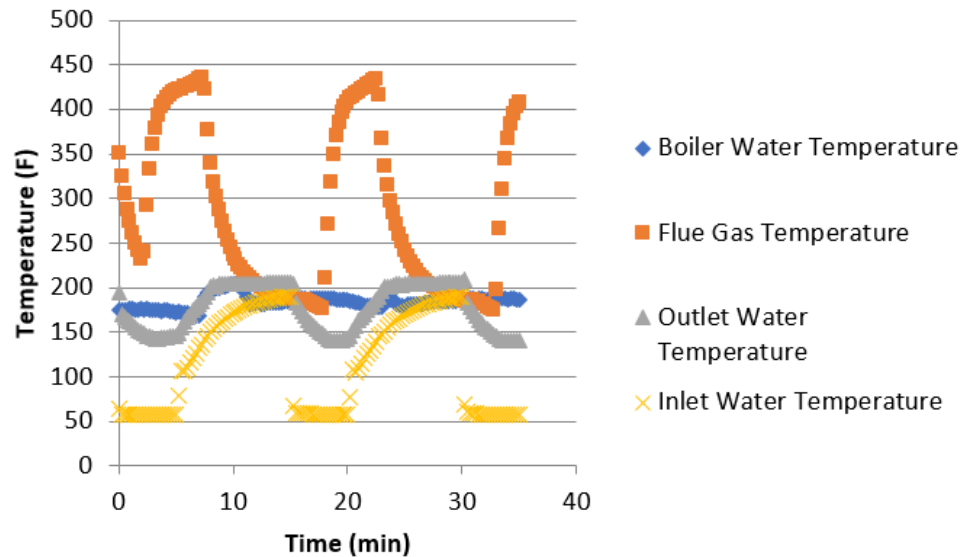
Objectives

- Evaluate the efficiency and capacity of a range of tankless coil boilers
- Develop best practice recommendations



Tests

- Hot water capacity
- Idle loss
- Efficiency in simulated use test



Efficiency – 24 hour simulated use test – conventional coil

Unit	Efficiency
Steel boiler - 3 gpm coil	33.9
Cast iron boiler - 5 gpm coil	38.5
Cast iron boiler - 3 gpm coil	40.8

Efficiency – 24 hours simulated use test with combi-boiler – external plate heat exchanger

Mode	24 Hour Efficiency (%)
Fixed Temperature	49.4
Fixed Temperature with added insulation on piping	51.8
Fixed Temperature with added insulation on piping and off cycle air damper	56.0
Cold Start	62.5
Cold Start with 2 minute heat-up and added insulation	67.1
Cold Start with 2 minute heat-up, added insulation and off cycle air damper.	67.0

Annual Analysis

- During non-heating season use DHW simulated use test
- During heating season – use the same linear output/input model that is the basis of the FSA
- Run different cases covering the range of measurements in this project.

Results of Annual Analysis

Case	Steady State Heat Output Capacity	Steady State Thermal Efficiency	Idle Loss	Summer Domestic Hot Water Production Efficiency	Annual Oil Use
-	Btu/hr	%	% of Steady State Energy Input Rate	%	gallons
A	125,000	80	2	33	1071
B	125,000	80	2	67	1009
C	125,000	80	1	67	968
D	125,000	80	3	33	1112
E	125,000	80	0.5	67	948
F	125,000	86	0.5	67	886
G	125,000	86	1.0	67	905
H	125,000	92	0.5	67	832
I	125,000	92	0.5	75	826

Best Practices

- Increase insulation in boiler jacket;
- Improve coupling between boiler water and DHW;
- Controls offer strong potential to improve summer performance;
- There is a comfort / efficiency trade off;
- How long is someone willing to wait for hot water?
- Higher boiler mass will increase time to recover from a lower temperature and deliver hot water;
- A high efficiency boiler with a well insulated indirect will still give better performance, but first cost is higher.