

The Department of Natural Resources, Canada Joins BTEC Efforts on Boiler Efficiency Protocol Testing.

BTEC is pleased to announce that the Department of Natural Resources of Canada (CanmetENERGY) is now a full partner in our efforts to develop a comprehensive and recognized efficiency standard for wood-fired boilers in North America. CanmetENERGY has provided a grant of \$16,250 USD to BTEC to expand the number of efficiency and emissions tests of the protocol that are being conducted at ClearStak LLC. In addition, on an in-kind basis, CanmetENERGY will be conducting analysis of the emissions filters for black carbon and performing chemical analysis on the wood pellets used in the test and the ash resulting. The draft standard is available on BTEC's website, www.biomassthermal.org.

It is fantastic to have the support of the Canadian federal government for this important work along with other funders who include the Massachusetts Department of Energy Resources, U.S. Endowment for Forestry and Communities, the West Penn Power Sustainable Energy Fund.

Scope of Work for the Boiler Validation Protocol

The validation testing occurred at ClearStak LLC on August 28-September 8. An eight-step validation testing regimen was developed for the testing to be performed which included:

- Step 1. Compare emissions to EN 303-5 report at 100% steady-state firing rate;
- Step 2. Compare emissions to EN303-5 report at 30% steady-state firing rate;
- Step 3. Single 'on cycle' during zero load condition by using a <50% load to reduce temperature of hot boiler to trigger 'on cycle' without thermal storage;
- Step 4. Single 'on cycle' during zero load condition by using a <50% load to reduce temperature of hot boiler to trigger 'on cycle' with thermal storage;
- Step 5. Compare Standby loss test results to calculated jacket loss determined in single 'on cycle' during zero load without thermal storage;
- Step 6. Compare Standby loss test results to calculated jacket loss determined single 'on cycle' during zero load with thermal storage;
- Step 7. Compare direct and indirect efficiency results during 15% heating load and on/off boiler operation without thermal storage; and
- Step 8. Compare direct and indirect efficiency results during 15% heating load on/off boiler operation with thermal storage.

The testing also incorporates multiple simultaneous emission methodologies to be compared to data from an EN-303-5 report. For Steps 1 and 2, emissions testing included:

- ASTM E2525;
- EPA Method 5;
- TESTO 380; and
- Manual Smoke Number Testing

Viessmann USA Donates Boiler Used in the Testing

One of the challenges in conducting this work has been securing a wood-fired boiler to be used in the validation testing that has also been tested to EN-303-5. Viessmann USA jumped into the breach and

provided a Vitoligno 300 C boiler for this validation testing project. BTEC appreciates Viessmann's generosity not only for the boiler, but for all the manpower in setting up and tearing down the boiler at ClearStak LLC. For more details on the unit, please see <https://www.viessmann.co.uk/en/residential-buildings/biomass-boilers/pellet-boiler/vitoligno-300-c.html>

New England Wood Pellets Donates Fuel Used in Validation Testing.

The Vitoligno 300 C is a pellet fueled boiler, so ClearStak LLC wanted a supply of premium pellets to be used in the testing. New England Wood Pellet donated ton of premium pellets to efforts and had them available for ClearStak within a week of the request. BTEC is so thankful for New England Wood Pellet's donation to the project.

Next Steps

It is anticipated that ClearStak LLC will provide a complete report of data and findings to BTEC by end of September. After receiving the report BTEC TRAC will be to convene a group to review findings and make recommendations to change protocol. In addition, another group will be formed to examine performance data, including both emissions and efficiency. This group goals will be to develop conclusions or just directions that the data suggest which may be use to present to technical or government agency audiences. For more information, please contact David Bancroft at david.bancroft@biomassthermal.org or 202-596-3974, Ext. 304.

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