April 2013

OMNI-Test Laboratories, Inc.

Summary for Project No. 518-D-01-1, "Biomass Fuel Bricks Comparative Emissions Testing"

OMNI-Test Laboratories, Inc. was retained by Malheur Lumber Company to evaluate the particulate emissions of their "Strawberry Mountain Forest Biomass Fuel Bricks" as compared to cordwood. Testing consisted of two sampling runs, one using the fuel bricks and the other using seasoned spruce cordwood, performed in an EPA Phase 2 certified wood stove.

Product Description

The Malheur Lumber Company product is made from wood fiber pressed into a brick shape weighing roughly 3.5 lb. No binders or other additives are used. Moisture analysis showed an average moisture content of 3.55% on a dry basis. Well-seasoned spruce cordwood was used for comparison testing. The spruce was burned without bark and had an average moisture content of 8.73% on a dry basis.

Test Method

The stove was set up and data collected according to EPA Method 28: Certification and Auditing of Wood Heaters, with some modifications made to accommodate the test plan. Whereas the method prescribes a firebox loading density of 6.3 to 7.7 lb of fuel per cubic foot of firebox volume, the bricks were loaded to a density of 3.1 pounds per cubic foot and cordwood was loaded to 3.0 pounds per cubic foot. As the fuel loads were reduced equally for both fuel types the reduced fuel loading density does not affect the results comparison between the two. It is important to note that because of the aforementioned changes any data generated cannot be meaningfully compared to wood stove emissions data from any other testing and any comparison should be limited to the test runs reported herein.

Emissions sampling was conducted in accordance with ASTM E2515-11: Standard Test Method for Determination of Particulate Matter Emissions Collected by a Dilution Tunnel. Stack concentrations of carbon monoxide and carbon dioxide were monitored throughout each test run.

Results

Emissions sampling demonstrated that the Malheur biomass fuel bricks produced less than half the total particulate matter (TPM) of the spruce cordwood as well as approximately half of the carbon monoxide (CO). Table 1 provides a detailed summary of the two test runs.

Table 1 - Emissions Testing Summary

Fuel	TPM Emissions Rate (g/hr)	TPM Emissions Factor (g/kg fuel)	Burn Rate (dry kg/hr)	Flue Temp (°F)	Flue Draft (in. H2O)	Flue CO (%)
Seasoned Spruce	3.00	2.46	1.22	308.9	-0.044	0.59
Pressed Log	1.31	1.00	1.31	329.8	-0.047	0.30
Percent Reduction	56.33%	59.33%				49.15%

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