

**Evaluation of Hardwood vs. Softwood Pellets  
Method 5G/28 Particulate Emissions from a Pellet Stove**

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## Summary

The U.S. EPA Method 28 does not specify the type of wood pellets required for the certification testing of pellet stoves. It simply states in section 16.1.1, “The test fuel shall be all wood pellets with a moisture content no greater than 20 percent on a wet basis (25 percent on a dry basis).” OMNI acquired two commercially available pellets, both Pellet Fuels Institute (PFI) premium grade pellets, one made of hardwood and one made of softwood. OMNI selected an exempt pellet stove and tested the two fuel types under identical stove operation (3 burn rates) and testing procedures. A comparison of the difference in particulate emissions between the two pellet types is shown in Table 1.

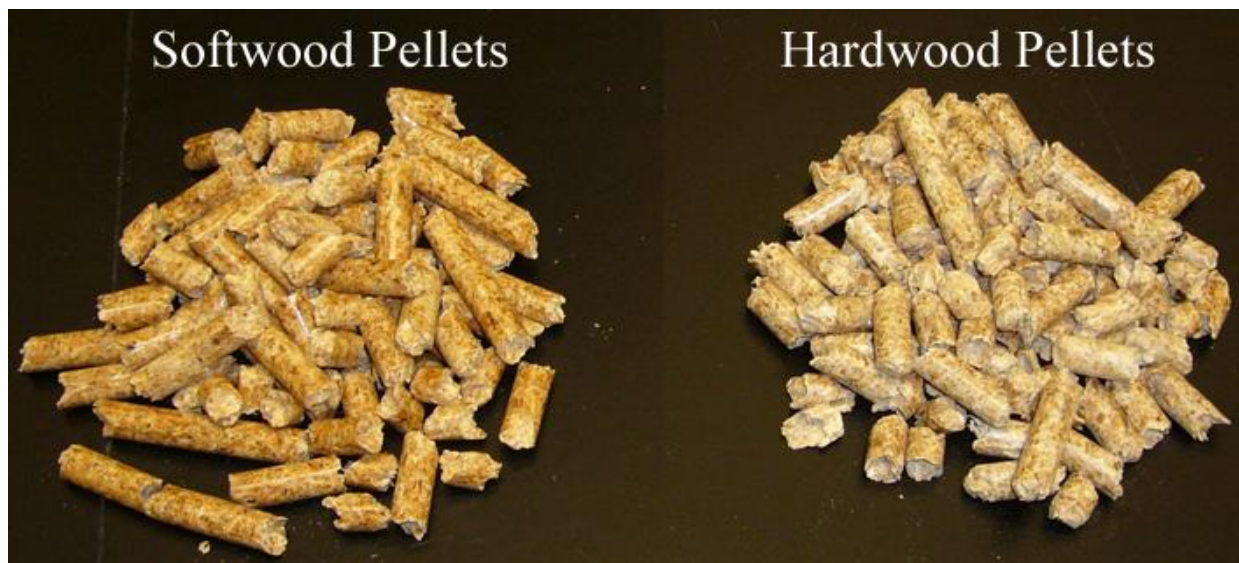


Figure 1. Softwood and hardwood pellets used for comparison.

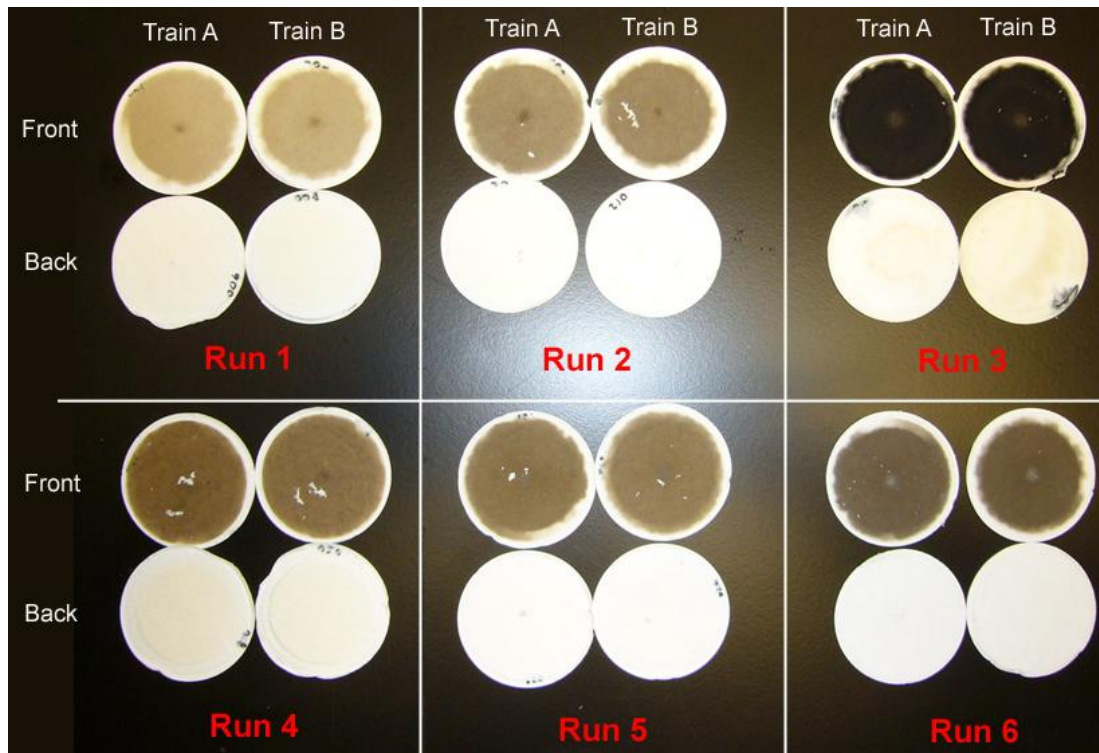


Figure 2. Filters from Method 5G particulate sampling train (see Table 1 for explanation of run numbers).



Figure 3. Top-feed pellet stove undergoing testing.

**Table 1**  
**Comparison of Particulate Emissions between Hardwood and Softwood Pellets**

Fuel Type	Run	Burn Rate Category	Burn Rate (Kg/h)	Emission Rate (g/h)	Emission Factor (g/Kg)
Softwood	1	Low	0.46	1.68	3.65
	2	Medium	1.01	0.60	0.59
	3	High	1.45	1.25	0.86
Hardwood <sup>1</sup>	4	Low	0.41	1.40	3.43
	5	Medium	1.01	2.34	2.32
	6	High	1.48	2.37	1.59

<sup>1</sup>The inorganic ash content of the hardwood pellets was determined to be 0.65 percent on an as-received basis. The PFI specification for inorganic ash content of premium pellets is 0 - 1 percent.