



Scoring Automated Cordwood Stoves in the 2018 Wood Stove Design Challenge

Sept. 17, 2018

The judges will use five categories to assess the stoves. They are, listed in order of importance: 1. PM emissions, 2. Automation and innovation, 3. CO and safety, 4. Thermal efficiency, and 5. Consumer appeal.

Each of the five scoring categories are weighted differently, with many points in the top category – PM emissions – and very few in the last category – consumer appeal. This is partly so that we do not disadvantage prototypes that are not market ready.

Scoring is one based on a scale from 1 to 100 and more than 80 of those points are solely based on instrumentation and objective criteria. In a few areas, scores by each judges may vary, but they are still judging based on agreed upon criteria. One of the main roles of the judges is to establish those criteria, approve the test method and oversee the testing and scoring.

1. PM Emissions

The most number of points is awarded in the PM emissions category because consistent and predictable emissions reductions are a primary goal of this competition. The main purpose of automation is to minimize emissions in real world settings. Stoves that perform well in the competition will be designed to combust cordwood and will be able to minimize emissions during start-up and reloading, as well as during cleaner parts of the burn. Points will be determined by the instrumentation used to measure PM and individual judges will not have discretion to alter points in this section. Hydrocarbons will also be measured.

2. Automation & innovation

The degree of automation to optimize and manage combustion under the variable conditions created by the test protocol will be assessed by the judges. Complete automation, where no operator engagement is required and combustion performance is well controlled throughout the test will receive more points than stoves where some level of operator engagement is required. The judges may also record the PM impact of reducing desired heat output right after reload to see if automation successfully prevents the stove from smoldering. For innovation, the degree to which the stove has technology or designs to improve emissions, efficiency or ease of use that is new or not commonly found in the marketplace will be assessed.

3. CO & Safety

Half the points in this category is simply CO readings in parts per million through the entire test burn. Other points are assessed based on impact of a power failure and whether the stove can continue to safely operate. Judges will assess other potential safety issues, including maintaining negative static pressure in the combustion chamber.

4. Delivered efficiency

The efficiency of heat transfer to the room will be measured using a stack loss method.

5. Consumer appeal

The final category includes the likely estimated cost of the stove, aesthetic appeal and other factors.