

Introduction

A TChar gasifier stove has two parts:

- Tbase (charcoal stove)
- Ttop (Top-Lit UpDraft/TLUD) gasifier

After all of the biomass is carbonized, the Ttop can be removed and the leftover char can be used



Figure 1: Testing of TChar gasifier stove



Figure 2: TBase with carbonized pellets

Objective

To build a clay center and a metal center TChar gasifier stove:

- Determine the best fuel by testing pellets of different compositions
- Compare and Contrast the two stoves

Method

Pellets

- Used waste from chicken farm to create renewable biomass energy fuel
- Multiple pellets of different compositions

Building Stove

- Gave materials and dimensions to a local tinsmith
- Modified Crista Roth's Ttop design

Methods

Testing Pellets

Calculated thermal energy (Q) absorbed by a pot full of water on top of the stove

$$Q = mc\Delta T$$

Q – thermal energy

m – mass of water

c – heat capacity of water

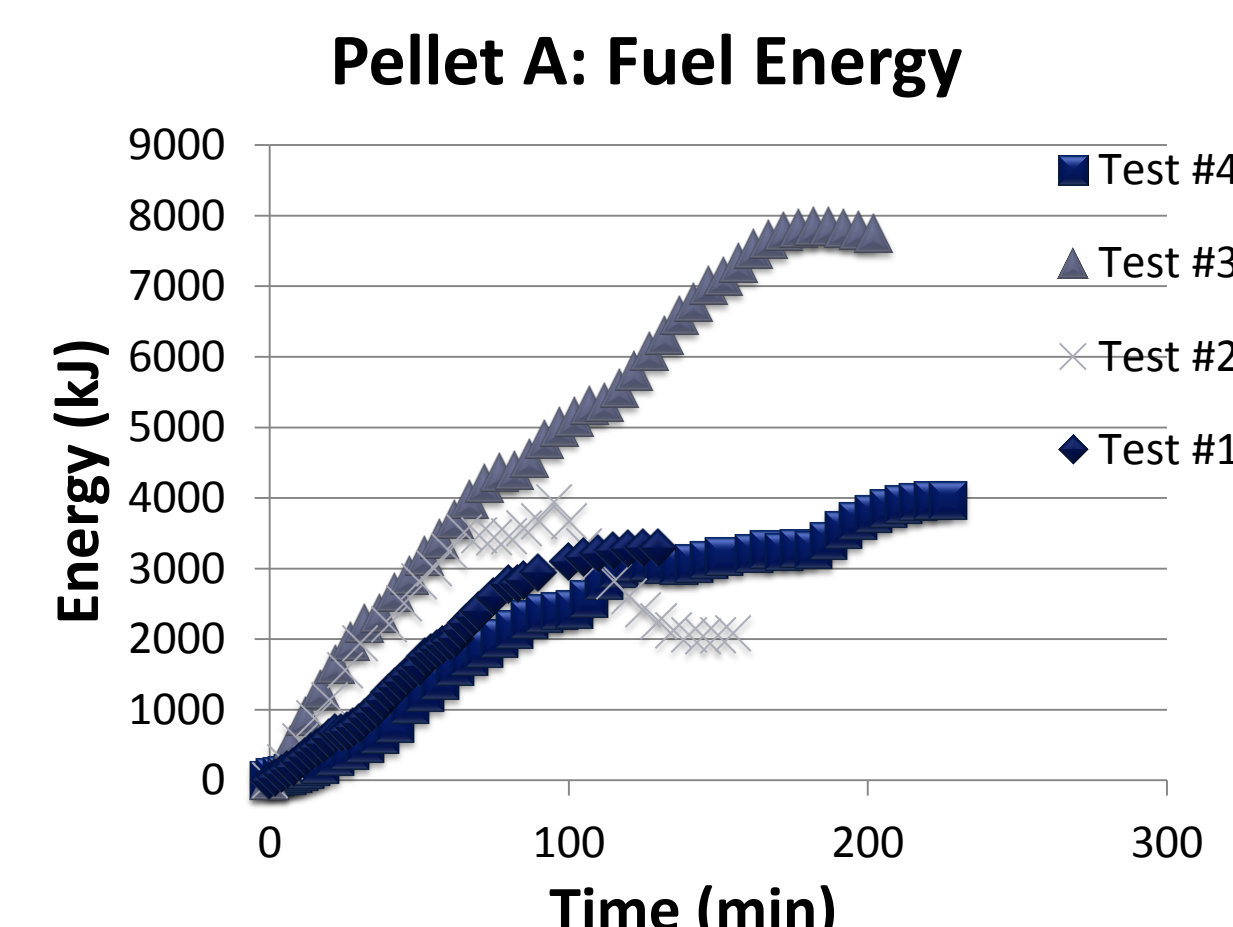
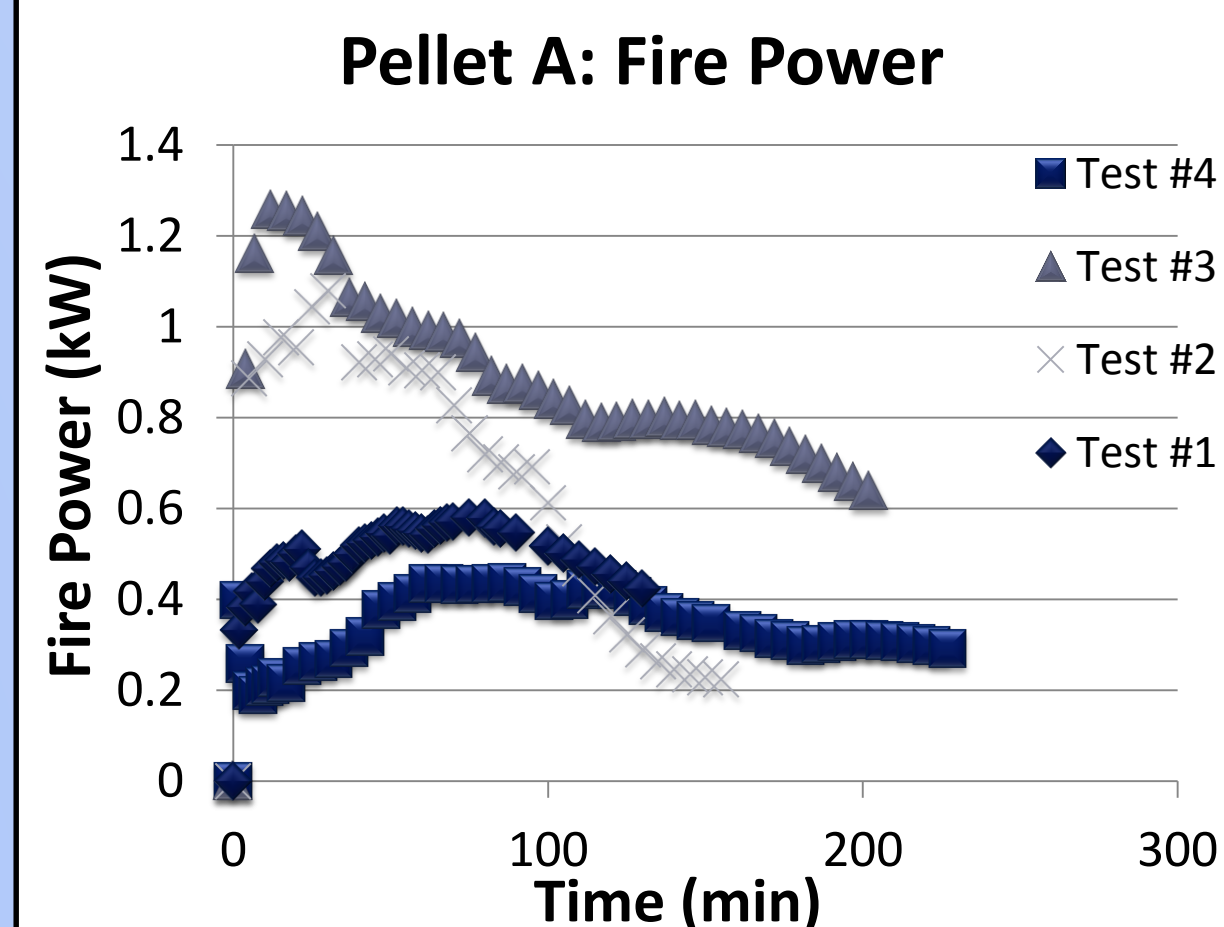
ΔT – change in water temperature

Results & Discussion

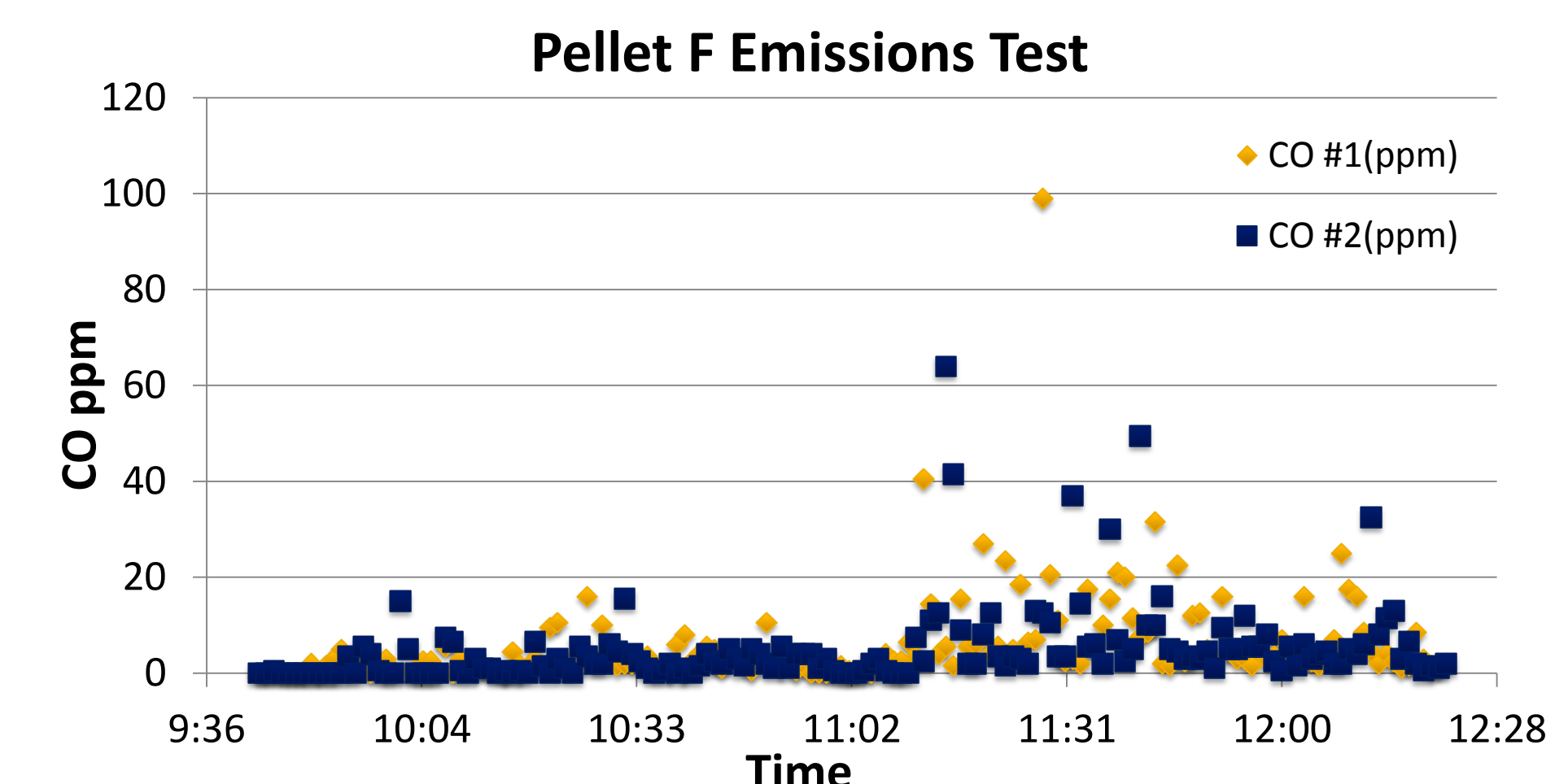
Table 1: Content of Fuels A-I

Fuel	A (1:1)	B	C	D (2:1)	E (2:1)	F (1:1:1)	G	H (1:2)	I (1:2)
Chicken Manus	✓		✓	✓		✓			✓
Sawdust	✓	✓			✓	✓		✓	✓
Corn Husks				✓	✓	✓	✓	✓	

CM/RH	Chicken manure with rice husks
SD	Sawdust
CH	Corn husks



Results & Discussion



- Stove can run up to four hours
- Large variation in results
 - Huge influence of surrounding conditions
- Distance from the pot to the flame (or end of the chimney) was often high
- Pot was not cover with lid
- Results of the different TChars cannot be compared due to different inner diameters of the inner cylinder
- **All pellets worked as a fuel**
- **TChar can be built with a clay inner cylinder**

Bibliography

- Anderson, Paul S., Crista Roth, and Robert J. Fairchild. *Tchar Technology for Cookstoves: Part B Sonstruction*. 2011
- Berlin: Deutsche Gesellschaft Fur Internationale Zusammenarbeit, 2014.
- Roth, Crista. *Micro-gasification: Cooking with Gas from Dry Biomass*. Publication. Ed. Heike Volkmer

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