



Improving Combustion Efficiency for Tier 3/4

Mixing, Architecture, Metering,
Moisture, Air, Time

MAMMA -T



Mixing

Make sure that very good mixing occurs combining all the gases, flames, and particulate matter together.

- Rocket: turbulence?
- TLUD: turbulence?
- Fan: turbulence!
- Reed, Only bottom air, Chinese



Architecture

Make the combustion chamber the right shape to encourage the greatest percentage of gases and particulate matter to enter flames.

- Swirl: natural draft Rocket
- Wings: natural draft Rocket
- TLUD: entrain the flame
- Fan stove: high velocity jets



Metering

Only make the amount of gases and particulate matter that will enter the flame.

- Control the rate of combustion: TLUD
- Push sticks in as they burn: Rocket
- Do not burn wood too quickly. Gases and smoke will not enter flame



Moisture

Moderately wet wood burns more slowly improving metering but wetter wood may not make sufficient flame.

- Dry wood can release gases and particulate matter too quickly.
- Moisture in the wood controls rate of burn and amount of flame.



Air

Make the air flow sufficient (amount and velocity) to encourage flame above fuel into which gases and particulate matter enter and are combusted.

- There is a compromise between lots of air which makes flame and cooling the fire which decreases heat transfer efficiency.
- Optimal: lots of flame and preheated air?



Time

The gases and particulate matter need sufficient time to combust in the flame.

- In fan stoves the horizontal jets of air create such a good zone of mixing that the pot can be right above the flames.
- In Rockets and natural draft TLUDS vertical columns of flame usually are needed to complete combustion.