



**Westwind Energy**  
Sustainable Energy Solutions

**ETHOS 2025**

# Westwind Energy Institutional Stove (WIS)



- 3<sup>rd</sup> generation stove designed with West African cooks / cooking in mind
- Use cases include: school feeding, hospital kitchens, large commercial kitchens, etc.
- Durable cast aluminum pot with 100L capacity (other sizes coming soon)
- Significant reduction of wood fuel use compared to TSF
- Minimal fugitive emissions exposure to the end-users

Metric		Test sequence phase		
		High	Low	Combined
Thermal efficiency without char (%)	Mean	37.3	44.1	40.7
	SD	1.5	2.4	1.9
	90% CI	1.1	1.7	1.4
Thermal efficiency with char (%)	Mean	38.4	45.1	41.7
	SD	1.9	2.5	2.2
	90% CI	1.4	1.8	1.6
Specific Energy Consumption (kJ/kg)	Mean	270	252	261
	SD	9.2	3.4	6.3
Char energy productivity (%)	Mean	2.7	2.3	2.5
	SD	1.7	0.7	1.2
Char mass productivity (%)	Mean	2.1	1.7	1.9
	SD	1.3	0.5	0.9
Cooking power (kW)	Mean	5.7	5.4	n.a.
	SD	0.5	0.8	
Firepower (kW)	Mean	15.3	12.3	n.a.
	SD	0.8	1.4	
Fuel burning rate (g/min)	Mean	56.3	45.0	n.a.
	SD	3.0	5.1	

Tier 4  
thermal  
efficiency!

Metric		Test sequence phase		
		High	Low	Combined
Fugitive PM <sub>2.5</sub> per useful energy (mg/MJ <sub>d</sub> )	Mean	2.07	1.77	1.92
	SD	1.50	0.90	1.20
	90% CI	1.23	0.66	0.95
Fugitive CO per useful energy (g/MJ <sub>d</sub> )	Mean	0.14	0.07	0.11
	SD	0.09	0.06	0.08
	90% CI	0.07	0.05	0.06
Fugitive PM <sub>2.5</sub> emissions rate (mg/s)	Mean	0.01	0.01	0.01
	SD	0.01	0.01	0.01
Fugitive CO emissions rate (mg/s)	Mean	0.78	0.38	0.58
	SD	0.55	0.32	0.43
Stack PM <sub>2.5</sub> per useful energy (mg/MJ <sub>d</sub> )	Mean	74.05	69.74	71.90
	SD	12.02	11.29	11.66
	90% CI	8.85	8.31	8.58
Stack CO per useful energy (g/MJ <sub>d</sub> )	Mean	6.75	6.72	6.73
	SD	2.42	2.10	2.26
	90% CI	1.78	1.54	1.66
Stack PM <sub>2.5</sub> emissions rate (mg/s)	Mean	0.42	0.37	0.40
	SD	0.07	0.03	0.05
Stack CO emissions rate (mg/s)	Mean	38.48	36.60	37.54
	SD	13.21	12.34	12.77

Tier 5  
emissions  
reductions!



# WIS (Interim) Manufacturing Process



- CNC Plasma cutter
- Spot welders (w/out cooling) and pneumatic rivets
- Manual bending brake
- H-frame press

# WIS (Interim) Manufacturing Process



## Challenges:

- Plasma tolerances
- Bending tolerances
- Rivet holes
- Spot welder duty cycle
- Material sourcing

# WIS Initial Pot Casting of Gen 3 Pot Pattern



- Green sand casted aluminum pots
- 3D printed pattern
- Wooden flask
- Forklift vs A-Frame and Chainfall
- Recycled Aluminum Feed



# WIS Initial Pot Casting of Gen 3 Pot



## Challenges:

- Sand composition, mulling, and qty
- Pattern and flask durability
- Heavy & unwieldy!
- Space for desired production rate



# Going forward

- New production facility with capacity of 15-20k domestic stoves/month and up to 500 WIS/month
- CNC lasers, press brakes, increased quantities of spot welders, etc.
- Full aluminum foundry with metal flasks, higher production capacity, aluminum patterns, mullers, mixers, etc.
- Employing and training hundreds of Sierra Leone locals, predominately women as workforce
- Looking forward to sharing success in ETHOS 2026!



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