



Aprovecho Research Center

Advanced Studies in Appropriate Technology Laboratory

P.O. Box 156 Creswell, OR 97426

541-895-5677

Benchmark Certifications

September 17th, 2007

The GTZ-Andes stoves were tested using the standard Shell-UCB 2003 Water Boiling Test. The goal of these testing procedures was to determine if the stoves meet the proposed performance benchmarks:

- 1.) **Fuel use:** Using the International Testing Pot, a wood burning stove without a chimney should use less than 850 grams of wood to bring to boil 5 liters of 25 degree C. water and then simmer it for 45 minutes during the UCB revised Water Boiling Test.
- 2.) **Emissions:** The wood burning stove without a chimney should produce less than 20 grams of Carbon Monoxide to boil 5 liters of 25 degree C. water and then simmer it for 45 minutes during the UCB revised Water Boiling Test.
- 3.) **Emissions:** The wood burning stove without a chimney should produce less than 1500 milligrams of Particulate Matter to boil 5 liters of 25 degree C. water and then simmer it for 45 minutes during the UCB revised Water Boiling Test.
- 4.) **Chimney Stoves:** Wood burning stoves with chimneys are exempt from the above standard if the stove does not allow more than an average of 50 parts per million of Carbon Monoxide to pollute the air anywhere within 30cm of the stove.

Testing results in relation to benchmarks are provided in the following documents. It should be noted that the fugitive CO was not measured due to testing in windy environments. It was, however, estimated based on previous measurements of observable smoke leakage.

Data presented is based on an average of tests conducted in both Peru and later in Bolivia completed after training of the testing team.



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Aprovecho Benchmark Certification for the Incawasi Wood Stove

October 22nd, 2007



STOVE NAME	Incawasi Wood Stove	
ORGANIZATION	GTZ	
LOCATION	Peru	
DESCRIPTION	Adobe stove body with two sunken pots and chimney. Ceramic combustion chamber insulated with wood ash.	
IMPROVEMENTS MADE	None necessary.	
MET BENCHMARKS?	YES	
	As Received	As Improved
TIME TO BOIL 5L	28.6	
FUEL TO COOK <i>30000 KJ BENCHMARK</i>	19,954	
FUGITIVE CO EMISSION <i>50 PPM BENCHMARK</i>	~ 15-20 ppm estimated	
SAFETY SCORE	40/40	

Certified By: Nordica MacCarty, Laboratory Manager



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Aprovecho Benchmark Certification for the Incawasi Mixed Combustion Stove

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STOVE NAME	Incawasi Mixed Combustion Stove	
ORGANIZATION	GTZ	
LOCATION	Peru -- Highlands	
DESCRIPTION	Adobe stove body with two sunken pots and chimney. Modified ceramic combustion chamber with feed tube and ash removal port, insulated with wood ash.	
IMPROVEMENTS MADE	None necessary.	
MET BENCHMARKS?	YES	
	As Received	As Improved
TIME TO BOIL 5L	23	
FUEL TO COOK <i>30000 KJ BENCHMARK</i>	13,900	
FUGITIVE CO EMISSION <i>50 PPM BENCHMARK</i>	~ 15-20 ppm estimated	
SAFETY SCORE	40/40	

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Aprovecho Benchmark Certification for the Peruvian Uganda Two-Pot Stove

October 22nd, 2007

STOVE NAME	Peruvian Uganda Two-Pot, Experimental Model	
ORGANIZATION	GTZ	
LOCATION	Peru	
DESCRIPTION	Adobe stove body with two sunken pots and chimney. Adobe combustion chamber with insulative mud.	
IMPROVEMENTS MADE	None necessary.	
MET BENCHMARKS?	YES	
	As Received	As Improved
TIME TO BOIL 5L	60	
FUEL TO COOK <i>30000 kJ BENCHMARK</i>	21,280	
FUGITIVE CO EMISSION <i>50 PPM BENCHMARK</i>	~ 15-20 ppm estimated	
SAFETY SCORE	40/40	

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Aprovecho Benchmark Certification for the Bolivian Uganda-Malena Two-Pot Stove

October 22nd, 2007

STOVE NAME	Bolivian Uganda-Malena Two-Pot Stove	
ORGANIZATION	GTZ	
LOCATION	Peru	
DESCRIPTION	Adobe stove body with two sunken pots and chimney. Stove body and combustion chamber made of cement-like mud.	
IMPROVEMENTS MADE	None necessary.	
MET BENCHMARKS?	YES	
	As Received	As Improved
TIME TO BOIL 5L	17.6	
FUEL TO COOK <i>30000 kJ BENCHMARK</i>	17,306	
FUGITIVE CO EMISSION <i>50 PPM BENCHMARK</i>	~ 15-20 ppm estimated	
SAFETY SCORE	40/40	

Certified By: Nordica MacCarty, Laboratory Manager