Construction Manual

Institutional and Household Shielded Fire Stoves

1. Required materials and tools:

Materials	Quantity for 1 stove Size 1	Size 2	Size 3
Anthill soil (clay)	2wheel barrows	4wb	6wb
Dry chopped grass (sawdust, dry chopped banana leaves)	1wheel barrows	2wb	3wb
Mud bricks	10 bricks		
Water (jerry cans (20L)	2	4	6
Moulds	3 moulds		

Tools	Purpose
Hoe	Digging foundation and mixing ingredients
Shovel or spade	Mixing ingredients
Jerry can	Fetching water
Trough (4mm)	Sifting ingredients
Trowel/blunt machete	Smoothing plaster/stove finish
Measuring tape	Taking measurements
Machete (Panga)	Cutting & sizing grass, banana stems & stove body
Wheel barrow (wb)	Carrying construction material
Optional:	
Spirit level	Inspecting horizontal level for laid bricks
Plumb line	Inspecting vertical alignment for laid bricks
Try Square	Inspecting right angled corners

2. Relationship between saucepan and Combustion Chamber

Saucepan Diameter (cm)		Square mould (cm)	Circular diameter (cm)	Height (cm)	wood box, 2/3 (cm)	Air Inlet, 1/3 (cm)
Size 1	≤ 27	12	13.5	24-30	9	4.5
Size 2	27-35	14	16	35	10.7	5.3
Size 3	35-45	16	18	40	12	6

Example: Saucepan Diameter , 27cm

Stove measurements Looking at the stove from the side

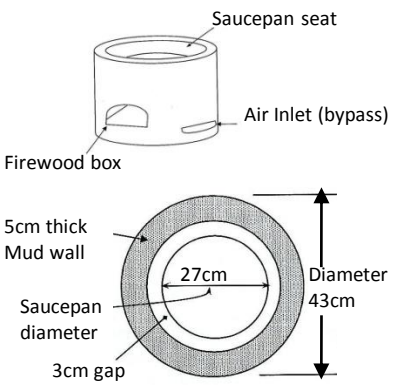
Combustion chamber mold: 13.5cm thick and 30cm height

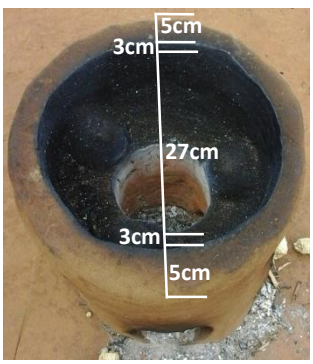
Firewood inlet: 9cm thick

Bypass air inlet: 4.5cm thick

Looking at the stove from the top

Important: The size of the stove depends on the size of the saucepan to be used in cooking!





3. Preparing the soil:

1. Chop the dry grass into small pieces using a machete (approximate length: 1cm)

2. Crash the anthill soil into smaller granules, and sort it to eliminate stones, sticks and other unwanted materials.

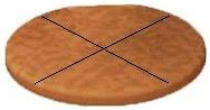
3. Mix the chopped dry grass and anthill soil in a volumetric ratio 1:2 (or with clay soil in a ratio of 1:1).

4. Slowly add water to the mixture to make it moldable.

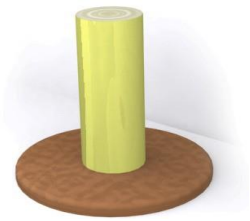
4. Building the stove:

1. **Lay the 6cm high foundation** of soil-grass mixture.

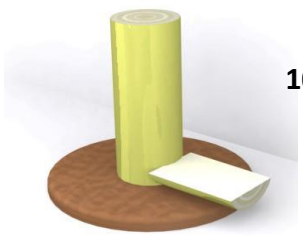
2. **Draw two perpendicular lines** across the stove foundation and mark their point of intersection.



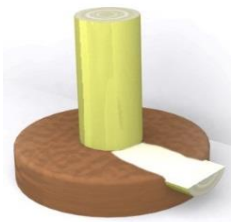
3. **Place the vertical combustion chamber mould** at the centre of the stove foundation.



4. **Place bypass air inlet mould** (4.5cm thick) at the stove foundation level at a right angle (90°) to the vertical stem as shown in the figure

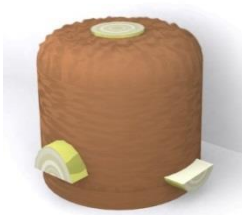


5. **Build the soil – grass mixture around the mould** up to the level of the flat face of the inverted stem



6. Position the bigger mould (9cm thick) **perpendicular to the bypass air inlet mould.** Ensure that its flat surface faces downwards to form the mould for the firewood inlet (magazine).

7. **Constructing the stove body:** Continue constructing the stove using the soil – grass mixture up to the height of the combustion chamber mould. Level the top of the stove structure as illustrated.

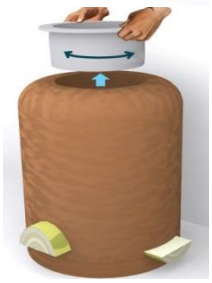


8. **Wet the outside of the saucepan** using a mixture of wood ash and water to ease its removal at a later stage.

8. **Position the saucepan** on top of centre of the vertical mould and then place a considerable weight e.g. a piece of brick or stone in the saucepan to hold it in position.

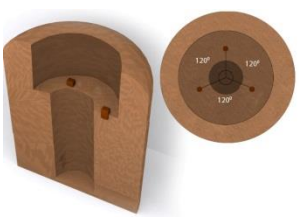
9. **Fill the space around the saucepan** with the insulation mixture as shown in illustration up to the height of the saucepan rim.

10. **Remove the saucepan** carefully by rotating back and forth while lifting it out.



12. **Cut out a 3cm thickness of the mixture layer** off the saucepan cavity to enlarge it and give room for the fire (flue gas) to flow around the saucepan cavity during stove use in future.

13. **Build 3 saucepan supports inside the saucepan seat**, equidistant from the centre of the combustion chamber with a uniform angular spacing of 120° as shown in figure



14. **Finishing the stove construction,** leave it to dry for 3-4 weeks and be using wet fingers to smoothen such that the stove is without cracks.

Published by:
Deutsche Gesellschaft
für Internationale Zusammenarbeit (GIZ) GmbH
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