

## „Estufa Chida“

Designed for communities & families in Central-America



### Introduction

The wood fired stove “Estufa Chida” is for people who like to make tortillas and are using several pots to cook inside the house. It is inspired by the “estufa justa” and is made for the population of Central-America where a high quantity of the population is cooking over an open fireplace. The advantages of “Estufa Chida” are:

- Easy to light
- Stores the heat for a long time
- Saves from 0 up to 75 percent of energy, depending on the efficiency of the previous system
- Removes 100% of fume out of the house
- Produce between 35 to 85 % less greenhouse gases than an open fire
- Easy, fast and cheap to build
- Long lifetime (more than 10 years)
- has got a high acceptance in a lot of communities in Central-America

## Needed tools and materials

Material	Amount	Costs	Tools
Bricks	60	192 MXN	Wheelbarrow
Sand	2 Wheelbarrows	60 MXN	Bucket
Lime (slaked)	2 bag (50 kg)	100 MXN	Shovel
Clay	1 Wheelbarrow	0 MXN	Trowel
Ash	3 buckets	0 MXN	Gloves
Salt	6 kg	36 MXN	Spirit level
“Plancha”	1 x	500 MXN	
Chimney	2 m (d = 10 cm)	120 MXN	
Chimney hat	1	30 MXN	
Pipe elbow	1 x	30 MXN	
<b>Total:</b>		<b>1000 MXN</b>	

1000 MXN (Mexican Pesos) is equal to 60 €

The costs can be lowered by 300 MXN using Adobe / COB instead of bricks. In this case half of the lime is not needed because the adobes can be stuck together with a mix of clay and sand. Half the chimney tube can be saved by building the part inside the house out of clay / COB.

## Construction

The pictures in this document are made during the optimization of an existing stove.

### Base

Most people cooking over an open fire have got an earthen base on which to build the fire. These bases can be used to build the new stove on top of it. The base of the stove in this example is built out of blocks with a concrete top. To build a base you will need 21 hollow concrete blocks, 50 kg bag of cement, iron grid for the top of the base and about 10 buckets of sand.

In order to use more organic materials and to save costs it is recommended to use instead clay, adobe, COB or bricks. Make sure the base is strong and dry before starting to build the stove on top.

### Stove

#### 1. Getting started, prepare the lime-sand mortar

- Use a 1 to 4 mix of slaked lime and sand (for example 1 bucket lime to 4 buckets of sand)
- The sand must be fine. If not sift it first
- Mix the sand with the lime very well
- Continuously add water and mix until the consistency is good (should not flow from shovel neither be too solid)

#### Memo:

- Always use gloves while working with mortar. Otherwise the lime will burn your skin!
- Prepare the mortar 3 hours before using it. This will give additional strength.

## 2. Start the construction

- Drop the bricks into a bucket of water and let them soak for 20 minutes until no more bubbles come out (the bricks have to be wet for the mortar to dry slowly)
- Get the dimensions of your stove using the grill ("plancha"). The Grill should overlap the bricks by 2 cm at all sides.
- build the first row around using the lime-sand mortar
- start to build the fire chamber: make a solid platform with two levels of bricks, covering half the total area of the stove.



## 3. Integrate the chimney

- Continue to build up the outer wall
- Build in the chimney at the center of the back wall after the third row of bricks
- Use elbow pipe in order to get a smooth outflow of air
- Make sure to seal in the pipe tight.

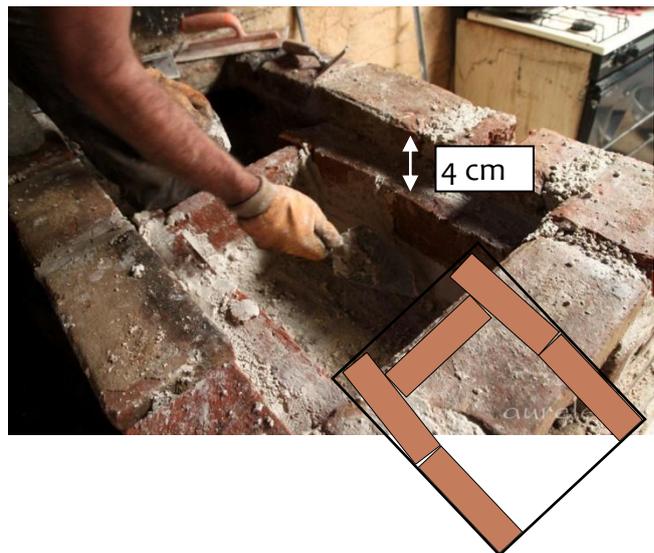


Memo: The chimney can also be built out of clay or concrete in order to save costs. Be aware that this could lower the efficiency and is harder to clean.

- If the frame of the grill / plancha has got feet remember to leave a space between the bricks free

## 4. Build the fire chamber

- The fire chamber should be about 2 bricks long
- In order to give the brick at the back a good hold, taper the last two bricks [see figure]
- The walls of the fire chamber should come to about 4 cms below the top row



### 5. Build the entrance

- The entrance needs to be smaller than the fire chamber in order to keep the heat inside and regulate the air flow. This determines the amount of firewood needed
- The ideal size is the length of a brick minus the two bricks it stands on (see pictures)



### 6. Make the chimney entrance

- Fill the back of the stove with ash (good for isolation) up to the level of the chimney
- Use half a tile to make the chimney entrance
- The entrance must be big enough to enter with your hand for cleaning
- Glue in place with a mix of clay, lime and ash (1 : 1 : 1). This mixture is highly fire resistance



### 7. Finish the back of the oven

- Fill the rest of the chamber with ash up to the level of the fire chamber
- Add a layer of salt (~2 cm / 6 kg) (salt is good to store the heat)
- Cover with the mix of clay, ash, lime
- Moist the adobe bricks and “paint” them with the mixture to get a better connection
- The gap between the back part and the grill / plancha should be about 2 cm
- Cover the fire chamber with the same mixture to protect the mortar and bricks



### 8. Build in the frame

- add a 1 cm thick layer of mortar (lime-sand)
- Press in the frame
- Add another centimeter of mortar outside of the frame
- *Add a clay plaster to the outside of the oven. To get additional strength you can add a little bit of cement.*



Hint: In order to get smooth surfaces of the clay plaster use a sponge with a lot of water

### 9. Insert Chimney

- Make a hole in your roof, put the chimney inside and connect it with the lower part.
- seal it with a strong mix of cement (1 : 2, fine Cement)
- Put the chimney hat on top of it

### 10. Following steps

- For the first three days water the mortar 3 times a day (Gives the lime-mortar enough time to harden and prevent it from cracking).
- Let the stove dry for 3 weeks before using it
- Afterwards start with several little fires (maximum 15 minutes, 3 times a day, 3 days)
- Use the stove maximum for 1 hour the first time you cook on it

### Usage

- Use only with dry firewood
- Leave the lid on top of the not used cooking spaces
- Don't block the entrance with too much firewood. This could extinguish the fire and causes smoke with a lot of soot which will block the chimney pipe.

### Maintenance

- Every 2 - 4 weeks: clean the chimney and the back part of the oven. Use a spoon and hit the chimney gently from top to bottom and bottom to top. This will make the soot / black carbon fall down where it can be removed by hand. This process is necessary in order to get a good suction
- Every year: give the inside part of the stove a fresh plastering. For this use a liquid mix of clay – ash – lime (1 : 1 : 1).

Based on ideas and experiences from Vicente y Lydiane ☺

Building Team: Aurelio, Chris, Vincente

Author and Fotos: Aurelio

Location: Ha Omek Ka, Chiapas Mexico

For more manuals see [www.linaria-ev.de](http://www.linaria-ev.de)

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