

The Sun Scoop

By Solar Clutch

The Sun Scoop was designed especially with the needs and desires of the city dwellers in Africa in mind. A number of issues came to the surface that we have tried to address.

1. The need for cooking more than one pot at a time
2. The need for portability and durability but yet keeping the cost down.
3. The need to be able to manufacture and repair a broken cooker locally with simple hand tools.
4. The need for simplicity of use.
5. The need for a ready supply of materials
6. The need to be able to cook on marginal cooking days



Since it is impossible to meet all the above needs with just one product we tried to find the best compromise that would still work for the people.

We opted for a box type cooker with an insulated box , a glass lid and 4 external reflectors.

Each cooker is individually hand made which allows for maximizing human labor and minimizing mechanized machinery. It utilizes the skills found among carpenters, tailors, and blacksmiths in the African cities.

The External Box

- Typically a plywood material is used for most box cookers in Africa but it is very heavy and not too portable.
- A plastic molded box used by some of the high end cookers was out of the question because of the high startup cost of an injected mold is about \$100,000 .
- The compromise was to use 4ft x 8 ft sheets of polypropylene flute board and hand-cut a box cooker out of one sheet using it for reflectors as well.
- The material will cut with a box knife, crease nicely and act as a durable hinge for the reflectors.
- This allows a local businessman to begin production with minimal start up costs.



The Lid

- The lid was a simple picture frame style with overlapping ends for simplicity and strength rather than 45 degree cuts.



- The glass was 2 layers of cheap single strength window glass readily available in any city. Two thin layers seem to be just as good as one thick sheet of glass.
- If broken it is easily replaced locally
- Three basic hinges are used for the door and two door clasps are attached to the front and bent to lock the door shut
- A strip of aluminum is attached to the side of the door with a screw. When it is swiveled it becomes a door rest to keep the door open when removing the pots.

The Seal

- Sealing the box well is important and a variety of ways could be used.
- Inner tube from auto and motorcycle are the mainstay for slingshots, shoes, buckets, and general repairs in the African cities. With the development of better synthetic rubber we found it able to sustain heat in excess of 300 degrees Fahrenheit.
- It is extremely durable and readily available and cheap. The cost for standard oven door seal material is out of the question.
- It can be cut with a razor or scissors and will flex enough to take up any variations in the glass door frame.



The Insulation

- We used rigid fiberglass insulation with aluminum foil backing
- The fiberglass insulation could be substituted with multiple layers of cardboard lined with aluminum foil.



The Inner Box

- We used thin aluminum sheet material.
- Any craftsman could copy this using flat stock of local roofing pan before it is rolled through the forming machine.
- Or simply have a blacksmith cut up 5 gal cans to shape.
- The box was made in pieces and the joints sealed with high temp silicone. This sealing is necessary in order to keep the insulation dry from the steam build up in the box as you cook.
- The metal needs to be painted and cured with a black non-toxic paint.



The Reflective Material

- We used adhesive backed polyester material with a silver reflective surface.
- Large roll stock of 2500 ft can be purchased and imported.
- Aluminum foil could be easily substituted for the reflective material and thin contact cement (for shoe repair) used to adhere to the plastic.



Adjustment in Cooking

- The angle of the panels are pre-set by locking to each other.
- Large snaps hold the panels in place together
- Most tailors or leather workers use these kind of snaps to repair coats and leather work
- The angle of the front panel is adjustable with a series of 3 snaps to allow for cooking at different times of the year and for cooking early morning and later in the evening.
- The angles of the panels are designed to maximize low horizon conditions. So when the sun is directly overhead the intensity of the sun offsets the need to constantly adjust the reflectors or tip the cooker itself.



Portability

- The panels are designed to fold up over the glass lid and snap in place
- This protects the glass surface from damage
- Soft cooking items can be stored in the cooker while it is not in use.
- A handle on the side allows for it to be carried like a suitcase

