Construction guide

Principles and use of the solar cooker

The solar cooker has been developed by Mr. J. Dierkx, in Ermelo, the Netherlands in 1982. It has been adjusted for The Recycle Center (Het Kringloopcentrum) in Sliedrecht, the Netherlands. The technical drawings have been made by Mr. A. de Kluiver in 1994.

The design of J. Dierkx is different from other designs for solar cookers because his design will create a hot air circulation within the (solar) cooking box. This because:
A. The glass cover is inclined, the box being higher at the rear.
B. The bottom is somewhat lower in the front.
C. The grate on the bottom, with the latches from the front to the rear. This enables the hot air to flow underneath the cooking pans.
D. The reflecting plate does direct the sun-rays towards the sloping front part of the innerbox, which causes an addi-tional warming up of the circulating air.
E. Seal the bottom of the glass steamtight with rubber strip rubber tape and clench this tightly to the box with butterfly-nuts (wingnuts) or fasteners

Innerbox

Preferably made from thin metal. Solder the seams. Using loose, separate sides use a flange of 1,5 centimeters, popnails , put SILICONENKIT in the seams and edges and cover the metal on the inside with silver paper (heatproof). Cover the metal with dull black paint in order to absorb the sun-rays.

Isolation

Either use glass wool, stone wool, raw cotton or wool, or feathers (fluff).

Outside box

Use light materials so the cooking box can be easily moved. For safety it is recommended to paint the outside white, so that the box will be noticed at night.

Reflecting plate

This is needed for 4 reasons:
1. To catch more sun-rays and direct them to the box.
2. To determine the time that the food will be ready. The re-flecting plate can be put in three different positions, this way it is possible to stipulate the time that the sun will enter the cooking box.
3. By putting the reflecting plate down, the glass cover will be protected during rain and at night.
4. To keep the food warm for a long time. When the reflecting plate is put down the food will cool down only 15 degrees Celcius per hour.
Cooking with the solar cooker, some advice

The cooking box is fit for cooking with water, milk etc, it is not fit for frying or baking pancakes!

When the cooking box is preheated the food will be ready 15 minutes earlier.

It is better to use two small cooking pans instead of one big pan.

To improve the heat transfer and therefore the cooking, some spoonfuls of water can be added in the box so to create steam.

Cooking pans and lids should be black.

The pans are heated from all sides. Therefore the food can not get burnt, and it is not necessary to stir the food. Lifting the glass cover during the cooking means that a lot of heat will escape from the box. The food will cool down and will take longer to get ready. Therefore it is recommended to put all the necessary ingredients in the proper amounts in the pans from the start. Foe-foe and Dekali is some kind of porridge from water thickened by starch. To make this type of food first bring the water to boil, than add the starch and other ingredients, stir and place back in the cooking box.

For many dishes it is recommended to put a grate in the pan (this is not the grate in the box on which the pans stand) to steam the food ready.

Warning When ready the food should be eaten. To warm up the food for a second time can be dangerous.

Are you using one of our solar cookers? Please send your reactions and information about the results to us.

Construction order

Start with the glass cover of the box, no. 1 and 2. Fix no. 3, 3a and 4 onto this. Mention the sloping side of 3. Subsequently fix the three-ply wood plates no. 3 and no 9 onto 3a. Next step is to assemble the frame of the box from 2 pieces of no. 5, 2 pieces of no. 6, 2 pieces of no. 7 and no. 10 and no. 11. Then the sides, no. 12. Now assemble the metal inner box steamtight (silicon kit). Add isolation and close the box with bottom sheet no. 19 (+20). Put together the glass cover (13+14). Then 15 and 16 the lowest glass sheet (25) fit up steam tight (silicon kit) with 24. upper spout with adhesive tape and locking plate 22 with adhesive tape openend some centimeters to air out. Fit up the rubber seal (18) and fix it to the box with hinges (21). Fit up the casement stay 26 and no. 27 with accessories. If possible the side of the reflecting plate facing the box could be rounded a little with lathes. This way more sunrays are directed towards the box. To protect the box when it rains, the reflecting plate has to be closed. To increase this protection above no. 8 and over the hinges 37 a piece of plastic can be fitted.
**Materials (in mm) and order of construction of the solar cooker**


d = millimeters

10 mm = 1 cm (centimeter) = 0.3937 inches (in)

12 inches = 1 foot

<table>
<thead>
<tr>
<th>Type / size</th>
<th>Numbers needed</th>
<th>Drawing</th>
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<tbody>
<tr>
<td>1 570-45-18</td>
<td>1 piece</td>
<td>page 3</td>
</tr>
<tr>
<td>1a 570-65-18</td>
<td>1 piece</td>
<td>page 3 en 4 upper glass of the glass cover</td>
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<tr>
<td>2 680-45-18</td>
<td>2 pieces</td>
<td>page 3 en 4 upper glass of the glass cover</td>
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<tr>
<td>3 644-30-18</td>
<td>1 piece</td>
<td>page 3 en 4 upper glass of the glass cover</td>
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<tr>
<td>3a 644-35-18</td>
<td>2 pieces</td>
<td>page 3 en 4 upper glass of the glass cover</td>
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<tr>
<td>4 599-19-19</td>
<td>2 pieces</td>
<td>page 3 en 4 upper glass of the glass cover</td>
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<tr>
<td>5 114-19-19</td>
<td>2 pieces</td>
<td>page 4</td>
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<td>6 343-19-19</td>
<td>2 pieces</td>
<td>page 4</td>
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<tr>
<td>7 510-19-19</td>
<td>2 pieces</td>
<td>page 4</td>
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<tr>
<td>8 644-396-4</td>
<td>1 piece</td>
<td>page 4</td>
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<tr>
<td>9 644-160-4</td>
<td>1 piece</td>
<td>page 4 en 1 three-ply wood back of box</td>
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<tr>
<td>10 606-19-19</td>
<td>1 piece</td>
<td>page 4 en 1 three-ply wood front of box</td>
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<tr>
<td>11 606-19-19</td>
<td>1 piece</td>
<td>page 4</td>
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<tr>
<td>12 see drawing</td>
<td>2 pieces page 1 en 3 three-ply wood side of box</td>
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<td>13 570-45-40</td>
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<tr>
<td>13a 570-65-40</td>
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<tr>
<td>14 680-45-40</td>
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<tr>
<td>15 570-20-6</td>
<td>2 pieces</td>
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<tr>
<td>16 558-20-b</td>
<td>2 pieces</td>
<td>page 2</td>
</tr>
<tr>
<td>17 screws</td>
<td>12 pieces</td>
<td>page 2 en 3 countersunk 5/70</td>
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<td>18 seal runner</td>
<td>list 2.60 meter, under glass cover see page 2</td>
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<td>19 bottomsheet 639-559-4</td>
<td>page 4</td>
<td>three-ply wood</td>
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<td>20 640-20-20</td>
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<td>page 4</td>
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<td>20/20</td>
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<td>25 glass 4 mm thick 568/568</td>
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<td>26 steel sheet 360-20-3</td>
<td>1 piece see page 2 casement stay reflecting plate</td>
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<td>27 steel sheet 376-20-3</td>
<td>1 piece see page 3 en 5 casement stay glass cover</td>
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<td>28 steel sheet 98-10-2</td>
<td>1 piece see page 3 en 5 groove No. 27</td>
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<tr>
<td>29 distance tube</td>
<td>2 pieces see page 3 en 5 groove No. 27</td>
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<td>30 steel sheet 40-10-2 saddle for No. 26 see page 5</td>
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<td>31 steel sheet 170-15-3</td>
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<td>32 metal 3 mm around grate at the bottom 3 pieces 340 length , page 5</td>
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<td>33 lathes 320-7-13</td>
<td>6 pieces for grate at the bottom see page 5</td>
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<tr>
<td>34 blank inner box see page 6 material tin, white iron or aluminium</td>
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<td>35 reflecting plate 660-610-4 made of three-ply wood see page 1</td>
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<td>36 lathe of reflecting plate 660-20-20</td>
<td>1 piece, page 1 for assembling 26</td>
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<tr>
<td>37 piano hinge 20/20</td>
<td>2 pieces of 80, see page 1 to assemble 35</td>
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Immediately after painting the reflecting plate white, cover the inside with silver paper. Avoid wrinkles.

Fasten in order to clinch the glass cover to the top of the box Straps, 2 pieces of about 820 mm length each.
RECIPES

(A) Meat:
The cooking time depends a lot on the quality of meat.

BEEF STEW
1 - 2 KG of beef meat cut into pieces
2 - 3 tomatoes
1 onion in small pieces
1 carrot
salt, pepper.
Put all the ingredients into the pot and add 1/2 cup of water.
Coking time: 3 - 5 hours.
The same stew you can do with goat, sheep or chicken.

(2) FRIED CHICKEN
Cut 1 chicken into pieces. By using a jiko, gas or electric cooker fry the
chicken pieces in cooking fat until they are brown from all sides.
Remove the meat out of the pot and add into the left over of fat 1 union, 2
tomatoes, 1 carrot. All cut into small pieces. Fry it for a few minutes, add 1
cup water and put the meat back. Now add spices like salt, pepper etc.
Cover the pot and put it into the Solar Cooker. Cooking times: 2 - 3 hours.

(B) OTHER FOODS

(1) Ugali
2 cups of drinking water
2 cups of unga ya mahindi (or less)
Stir well and put it into the Solar Cooker, you don't need to stir the ugali, while
it is cooking
Cooking time 2 hours

(2) Rice
2 cups of rice
2 cups of drinking water (or less)
1 teaspoon of salt.
Cooking time 2 - 3 hours
Variant:
Boil it for 1-2 minutes on a stove. Before you put it into the Solar Cooker.
Cooking time: 40 - 50 minutes
Note: You can simply cook English potatoes or sweet potatoes by putting them
and leave them with the skin. Cooking time: 3 - 4 hours.

(C) VEGETABLES

(1) Carrots
1 KG carrots peel and cut them into small pieces
1/2 cup of water
1/2 teaspoon of salt
Cooking time: 2 - 3 hours
Variant: Mix carrots and peas.

(2) GATHERI
1 KG of Peas
1 KG of peeled fresh maize
1 KG of potatoes. peel and cut into small pieces.
Add enough water and salt.
Cooking time: 3 - 4 hours
You take the pot out and mush it.

(3) BEANS
Sock the dried beans over night. Wash them and put them with enough water, salt, 1 - 2 tomatoes and 1 onion, cut onto small pieces into the Solas Cooker.
Cooking time: 3 - 4 hours.

(D) CAKES
To bake a cake in the Solar Cooker you have to put a flat stone into the Solar Cooker which has to be heated up, by the sun for about 1 hour before you place the cake on top of the stone. This will compensate changes in temperatures.

(1) Plain Cake
Yello.
4 Eggs
1 cup of blue band or butter (melted)
1 cup of sugar
Stir it very well and add
4 cups of wheat flour
3 teaspoons of baking powder
1 cup of milk
Stir it very well until it is a soft dough and put it into a mole for cakes which you have rubbed out with some bleu band. Cover with a black lid
Baking time: 3 - 4 hours

(2) BROWN CAKE
The same like the plain yellow cake, but you add 2 teaspoon of cocoa. and if you like 2 teaspoon of cocoa and if you like 1 teaspoon of cinamon into the mixture out of eggs, blue band and sugae.

(3) Sweet Yello Cake
6 Eggs
1 cup of blue band or butter (melted)
1 1/4 cup sugars
Stir well end add
3 cups of wheat flour
3 teaspoons of baking powder
Stir well and put it into the mole.
Baking time: 3 - 4 hours

Note: There are many other food stuff that can be cooked in the cooker which are not mentioned e g. FISH and maize with Beans. The result will majorly depend on the heat available.