

## Technical description of the Solar Steam Cooking System in Taleti, Abu Road

The solar cooker in Taleti is based on totally 84 concentrator dishes invented by Wolfgang Scheffler of Switzerland and assembled in a Brahma Kumaris / WRST workshop in Taleti, Abu Road.

To further boost the output of the new solar steam-cooking project in Taleti a improved design for the parabolic concentrators, the receivers and steam generator has been developed with the help of Wolfgang Scheffler, Deepak Ghadia, Brahma Kumaris Solar Department and the company High Temperature Technology of Germany a World leader in heat transfer technology.

For the solar cooker in Taleti the total reflective surface of the mirrors has been increased by 2 sq. up to 9.5 sq. As reflective material white glass from Germany with a reflection of 94% is used.

One of the most important parts in concentrator technology is the receiver. For the Solar Steam Cooking System in Taleti a shell type receiver out of MS, dia 35cm (schedule 40, boiler grade) has been developed.

The water in the receiver gets heated up by two parabolic concentrators (7 kW) focusing on both flat sides of the receiver.

The hot water immediately shoots up as per the thermosyphone principle into the highly insulated header pipe and heats up the water there.

Immediately cool water will flow down into the receiver through a integrated  $\frac{1}{2}$  " pipe.

The steam will be generated accordingly directly in the header pipe dia 12"(schedule 40, boiler grade) above the receivers. As the receivers are working as per the thermosyphone principle there is no need of a separate steam generator, a heat exchanger or any circulation pump. This increases the efficiency and there will be no interruption caused by power cuts.

Through its design and dimension the header pipe works as steam generator, temporarily steam storage and feed water reservoir. (please see attached drawings). Totally 14 mirrors are focusing on 7 receivers in one module.

Totally 6 of these modules are interconnected in a common steam drum. The system is generating a maximum of 3500 Kg steam per day (6 Kwh/sqm) and is presently the largest solar steam cooking system in the world. In combination with highly insulated cooking pots the system already generated enough steam for max. 35000 meals per day.

The idea of this new design is to minimize electrical loads like pumps etc, to economize the piping and overall design and to boost the efficiency at least by 20% as compared to the system in Mt. Abu.

The aim of the project is to develop and test such a solar based steam generating module ( 600 kg steam per day) that this module easily can be replicated at moderate costs all over the country.

As the system has a modular design of 14 mirrors the use can be adapted to either cooking or industrial purposes.

There is an expected pay back of the system at present kerosene prices of 5 years.