

FOLDABLE DOME TYPE SOLAR DRYER – A NEW DESIGN

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DESCRIPTION:

A new design of foldable type solar dome dryer has been recently fabricated and tested.

Base of the dryer is made by plywood board and bottom side of the board is covered by M.S. sheet. Upper side of the board is covered by aluminium sheet which is painted dull black by automobile muffler paint.

Longitudinal side of the dryer base is hinged in two places to make it three parts- bottom and two sides. When the dryer base is to be kept in folded position, both sides of the base can be folded upward keeping bottom part in horizontal position as usual. During folded position, a hinged strip acts as a lock to hold two sides firmly attached with each other in parallel position. Eight numbers of caster wheels are provided at the base of the dryer base. Four numbers wheels are attached with bottom part of the dryer base and each side part is provided with two wheels. These caster wheels are fitted for easy adjustment and transportation.

Single aluminium tray fabricated by aluminium screen and aluminium “L” channel is to be placed on dryer base during operation. The tray is painted black with dull black paint and bottom of the tray is provided with four numbers roller wheels for easy placement and removal from dryer inside.

Five numbers Aluminium strips are given to parabolic shape for formation of a parabolic dome. Both longitudinal ends of aluminium sheet which is attached at the top of the plywood board

are bent to make both side slide channels. Parabolic shape strips are bent horizontal at both ends and placed inside of slide channels so that, these can be slide longitudinally on the dryer base.

To make solar dryer roof cover, UV resistant transparent parabolic shape polythene dome with both end covers is made by the use of silk thread in a sewing machine. Cold air entry holes are provided at the bottom end of one end cover and hot air outlet holes are provided at the top of opposite end cover. This polythene dome is then attached with parabolic shape aluminium strips by screws and washers. When parabolic aluminium strips slide nearer to each other, the polythene dome is folded and when strips slide towards longitudinal ends then the dome is covered the whole dryer base as a dome shape roof.

When to keep the dryer in folded position, all aluminium strips with polythene dome are brought longitudinally towards the middle position of the dryer base so that, all strips with folded polythene dome can be accommodated on the bottom part of three fold base. Thereafter, both sides of the base are to bring vertically upward.

PHOTOGRAPHS



FOLDABLE DOME TYPE SOLAR DRYER



DOME WITH STRIPS ARE IN FOLDED POSITION



FOLDED DRYER



DRYING TRAY

MATERIALS:

1. 2cm thick plywood board.
2. 1mm thick M.S. sheet.
3. 1mm thick aluminium sheet.
4. 2mm thick aluminium channel.
5. Aluminium screen.
6. 2mm thick 1.2cm width aluminium strips.
7. UV resistant transparent polythene sheet.
8. Dull black automobile muffler paint.
9. Caster wheels.
10. Hinge, lock, screw etc.

DIMENSTIONS OF THE DRYER:

Length: 120cm.

Width: 90cm.

Height- 60cm.

DIMENSTIONS OF THE TRAY:

Length: 110cm.

Width: 80cm.

Height from the dryer base: 4cm

TEST RESULTS:

Test date, time and location- between 6th April'2007 to 16th February, from 9am to 1pm,
Jalpaiguri (26.32⁰ N latitude, 88.46⁰ E longitude).

Average intensity of solar radiation during test period: 0.50 kW per square metre

Ambient temperature: 30 degree Celsius.

Peak temperature inside of empty solar dryer: 45 degree Celsius.

PROTOTYPE FABRICATION COST:

INR.8000 (eight thousand) only.