

## Minimum Requirements for installation of Solar Water Heating Systems in Field

The FPC based systems will be from BIS approved manufacturers and ETC/ Heat pipe based systems from MNRE approved manufacturers/suppliers. The Systems will have the following minimum requirements for installation under subsidy/ soft loan scheme of MNRE:

### General Requirements

- i) System installed in high windy area will be well grouted/ clamped with collectors installed in a way that it is able to sustain the highest wind pressure of that area.
- ii) All the collectors will be south facing inclined at suitable angle to give best performance in winter
- iii) There will not be any shadow falling on the collectors from nearby structures or of other collectors in front or back row
- iv) Hot water pipe lines of any kind in colder regions will be fully insulated from the point of draw of water from tank to delivery points. In other regions also care will be taken to avoid heat losses from pipelines.
- v) System will be installed nearest to the point of hot water usage to avoid longer pipeline & higher heat losses.
- vi) Where water quality is bad either FPC based systems with Heat Exchanger or ETC based systems will be installed.
- vii) The workmanship & aesthetics of the system will be good and it should be visible to anybody
- viii) Air vent pipe, make up water and cold water tanks will be installed as required for smooth functioning of the system
- ix) There won't be any leakage observed in the system from tanks/ collectors/ pipelines
- x) No electric back up will be provided in hot water storage tank at places where electric geysers are already installed. At places where electric geysers are not installed, electric back up could be provided in upper portion of storage tank, if necessary. Other option is to have an instant/ very small geyser in bathroom with outlet of solar hot water storage tank connected to its inlet and thermostat set at say 40 C. This will help consuming less amount of electricity during non-sunny days.

### Technical Requirements

Flat Plate Collectors : ISI mark (2 sq. m. absorber area for 100 liter tank capacity system in colder region and 125 liter for other regions)

#### Evacuated Tube Collectors/ Heat pipes

Type of tubes 3 layer solar selective (Inner layer of copper coating should be visible). Detailed specifications of tubes will be as per the guidelines laid down by MNRE for empanelment of manufacturers of ETC based systems & made available at MNRE website

No. of tubes in a system To have minimum 1 ½ sq. m. of absorber area for 100 liter tank capacity system. Absorber area will be calculated as follows:

Area in Meter = Number of tubes X Radius in Meter X Length in Meter.

Accordingly, 14 tubes of Dia : 47 mm & length : 1500 mm and 10 tubes of Dia 58 mm & length : 1800 mm will be required for each 100 lpd system. For higher capacity systems, the no. of tubes

calculated as per above could be slightly less. For details, please refer to MNRE Circular no. 25/5/2009-10/ST dated 2<sup>nd</sup> March, 2010.

Procurement : From reputed supplier (Details of supplier to be provided)

**Storage Tanks, Piping, Support structure etc** ( To be all indigenous & not imported)

Inner tank material : SS 304 or 316 grade min/ MS or any other material with anticorrosive coating for hard water with chlorine contents.

Inner tank thickness : For SS minimum thickness will be 0.5 mm when using argon arc or metal inert gas for welding and 0.8 mm when using other type of welding. For MS minimum thickness will be 1.5 mm. No leakage under any kind of negative or positive pressure of water will be ensured.

Inner tank welding : TIG / Seam/ pressurized weld (Open arc weld not permitted )

Storage tank capacity : Not less than system capacity. In case of ETC based system, volume of tubes & manifold not to be included in tank capacity.

Thermal insulation of tanks & hot water piping : Minimum 50mm thick with CFC free PUF/ Rockwool having density of 28-32 kg per Cu.mtr. For colder regions, it will be doubled.

Outer cladding & Frames : Al/SS/FRP or GI powder coated. MS may also be used with special anti-corrosive protective coatings. Thickness of sheets will be strong enough to avoid any deformation of the cladding.

Valves, cold water tank, vent pipe, heat exchanger, make up tank & measuring instruments : Of ISI mark or standard make

Support structure for Collectors, piping, tanks etc. : Of non corrosive material or have corrosion resistant protective coating. They will be strong enough to sustain their pressure during the lifetime of system.

An undertaking will be given by the manufacturer/supplier confirming to above requirements while submitting proposals to MNRE/SNAs or claiming subsidy. The manufacturer will also provide the detailed specifications of each and every part of his system to the beneficiary alongwith O&M manual. In case any manufacturer/supplier is found not sticking to above requirements, his name will be removed from MNRE list. These requirement will also be put on MNRE website for the knowledge of beneficiaries and other stakeholders. Salient features of the system will also be highlighted on a plate fixed on front surface of the tank alongwith name of manufacturer/ dealer & his contact No.

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Note: Beneficiaries of systems may contact MNRE at following address if manufacturer/dealers are not sticking to above requirements.