

## Technical Specifications of “Solar thermal system”

### Bidder Eligibility Criteri:

#### 1.0 Bidder Eligibility Criteria i:

| I  | <b>Bidder Eligibility Criteria-I<br/>(Public Procurement – Preference to Make in India)</b>   | Class I /<br>Class II  | Local<br>Content<br>value | Reference,<br>Page No. |
|----|---|------------------------|---------------------------|------------------------|
| I  | Only 'Class-I local suppliers' and 'Class-II local suppliers', as defined under DIPP, MoCI Order No. P-45021/2/2017-PP (BE II) dated 16 <sup>th</sup> September 2020 and other subsequent orders issued therein.  |                        |                           |                        |
| II | <b>Bidder Eligibility Criteria-II</b>   | Compliance<br>(Yes/No) | Reference<br>Page No.     | Remarks, If<br>any     |
| 1  | The bidder/OEM should have supplied at least 5 similar items to IITs, NITs, IISERS, CSIR Labs or other Govt. R&D organizations in the last 10 years, PO copies or installation certificates along with contact details of end user need to be submitted as the proof of supply. IIT Madras reserves its right to verify the claims submitted by the bidder and the feedback from the previous customers will be part of technical evaluation. |                        |                           |                        |

#### 2.0 Technical Compliance:

| Si.<br>No. | Description  | Specifications           | Complied<br>/Not<br>Complied | Reference<br>page No |
|------------|--|--------------------------|------------------------------|----------------------|
| 1          | Type of solar thermal collectors   | Evacuated tube collector |                              |                      |
| 2          | System capacity @ 1000 W/m <sup>2</sup>                                  | 15 kW at 120 °C          |                              |                      |
| 3          | Total Floor Space m <sup>2</sup>   | 27 m <sup>2</sup>        |                              |                      |
| 4          | Collector Dimensions per ETC (Length × Width × Height) mm of each Module | 2005 × 2196 × 136        |                              |                      |
| 5          | Absorber Area per Module   | 2.4 m <sup>2</sup>       |                              |                      |
| 6          | Gross Area per   | 4.4 m <sup>2</sup>       |                              |                      |

|    |   |  |  |  |
|----|---|--|--|--|
|    | Module  |  |  |  |
| 7  | Number of Modules of Solar Evacuated Tube Collector (ETC) | 6  |  |  |
| 8  | Maximum Operating Pressure                                | 8 bar  |  |  |
| 9  | Flow Rate of Each Module                                  | 2 LPM (max 15 LPM)   |  |  |
| 10 | Peak Output of Each Module                                | 2014 W   |  |  |
| 11 | Evacuated Tube Specifications                             | <p>Material: Borosilicate 3.3<br/> Tube Style: Twin wall all glass<br/> Dimensions: <math>\Phi</math> 58 mm outer tube;<br/> <math>\Phi</math> 47 mm inner tube;<br/> 1.8 m length;<br/> 1.8 mm outer tube wall<br/> Thickness</p> <p>Absorber Material: Selective coating<br/> Absorptance: &gt; 93%<br/> Emittance: &lt; 8%<br/> Vacuum: <math>P &lt; 5 \times 10^{-3}</math> Pa</p> |  |  |
| 12 | Heat Pipes Specifications                                 | <p>Material: High Purity Copper<br/> (oxygen free) (ASTM: C10200: DIN:<br/> OF-Cu)<br/> Maximum heat transfer capacity: 220<br/> W<br/> Working fluid: nontoxic liquid<br/> (suitable proprietary mixture)<br/> Startup temperature: <math>\sim 25</math> °C</p>   |  |  |
| 13 | Header Pipe Specifications                                | <p>Material: Copper (ASTM: C1100,<br/> DIN: ECu-58)<br/> Brazing rod material: BAg45CuZn<br/> Connection option: 3/4 " Male BSP</p>  |  |  |
| 14 | Mounting Frame Material                                   | 6005 - T5 Aluminium Alloy with Anodized Finish   |  |  |

|    |  |  |                                   |  |  |
|----|--|--|-----------------------------------|--|--|
| 15 | Manifold Casing Material   | 3003 Aluminium with PVDF Coating   |                                   |  |  |
| 16 | Manifold Insulation  | Material: Glass wool (<0.043 W/mK)<br>Thickness: Average > 50 mm   |                                   |  |  |
| 17 | Tube Clips, Fasteners  | Material: Stainless Steel 316  |                                   |  |  |
| 18 | Common Storage Tank / Thermal Energy Storage for Heat Transfer Fluid | Material of Construction: Stainless Steel 304<br>Dimensions: $\Phi$ 0.3 m outer diameter, 0.8 m height, 0.01 m thickness<br>Insulation Material and Thickness: Glass Wool and 50 mm<br>Capacity: 0.048 m <sup>3</sup>  |                                   |  |  |
| 19 | Flanges  | Material: Stainless Steel 304 for Hot water Storage tank; Brass for Solar Collector field  |                                   |  |  |
| 20 | Piping   | 1" Copper pipes with required fittings   |                                   |  |  |
| 21 | Insulation for piping  | Insulation of glass wool of 70 mm thickness provided with Aluminum cladding for hot water lines.   |                                   |  |  |
| 22 | Mounting structures  | Suitable mounting structures made of Aluminium frames provided for solar thermal plant.  |                                   |  |  |
| 23 | Piping and Instruments   | All the interconnecting pipes and valves shall be provided as per IBR standards.<br><br>Suitable sensor insertion points shall be provided for sensing the parameters (Flow, temperature, pressure).<br><br>Adequate flanged connections shall be provided for facilitating the process piping |                                   |  |  |
| 24 | Hot Water Pump   | Make   | Grundfos Pumps or equivalent make |  |  |

|    |          |                          |                             |  |  |
|----|----------|--------------------------|-----------------------------|--|--|
|    |          | Type                     | Multistage Centrifugal Pump |  |  |
|    |          | Rated flow               | 5.8 m <sup>3</sup> /h       |  |  |
|    |          | Rated head               | 40.3 m                      |  |  |
|    |          | Pump orientation         | Vertical                    |  |  |
|    |          | Rated Power              | 1.1 kW                      |  |  |
|    |          | Electrical               | 3 Phase, 415 V              |  |  |
| 25 | Warranty | 1 Year Standard Warranty |                             |  |  |

(Note: It is mandatory for the bidders to provide the compliance statement in tabular column format along with catalogue page number (comply/not comply) for the Above points with document proof as required. Failing which bidders will be technically disqualified)