Concentrated solar thermal for process heat

Utilise the energy of the sun to reduce fuel costs and increase profits
Solar power is an inexhaustible, free source of energy, and India receives plentiful solar radiation. A.T.E. has developed an innovative Concentrated Solar Thermal system that can provide process heat for various industrial and commercial applications. A.T.E.’s unique approach to combine energy efficiency with renewable solar energy delivers the largest savings in carbon-intensive fuels, and directly influences the bottom-line.

A.T.E.’s solar thermal concentrator automatically follows the sun throughout its motion in the sky. It reflects and concentrates sunlight onto a “receiver” filled with water and mounted at the focal point of the concentrator, thereby generating steam. A.T.E. is empanelled as a manufacturer with the Ministry of New and Renewable Energy (MNRE), Government of India. MNRE’s Regional Test Facility at the University of Pune has certified the performance of the A.T.E. solar concentrator.

**User benefits**

- Customised to the application
- Attractive payback
- No special skills required for operation
- In-built safety features
- Low maintenance costs

**General data**

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aperture area</td>
<td>25 m²</td>
</tr>
<tr>
<td>Receiver aperture diameter</td>
<td>0.35 m</td>
</tr>
<tr>
<td>Focal length</td>
<td>4 m</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>50-180 °C</td>
</tr>
<tr>
<td>System weight</td>
<td>1800 kg</td>
</tr>
<tr>
<td>Maximum wing speed under tracking</td>
<td>10 m/s</td>
</tr>
<tr>
<td>Useful life of structure</td>
<td>20+ years</td>
</tr>
<tr>
<td>Receiver absorptivity</td>
<td>95%</td>
</tr>
<tr>
<td>Mirrors</td>
<td>Solar-grade, &gt;85%</td>
</tr>
</tbody>
</table>

**Thermal performance**

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity of steam generated/day*</td>
<td>100 kg</td>
</tr>
<tr>
<td>Dryness fraction of steam</td>
<td>&gt;85 %</td>
</tr>
<tr>
<td>Annual steam generation</td>
<td>24000-30000 kg/y</td>
</tr>
<tr>
<td>Rated thermal power**</td>
<td>13.75 kW</td>
</tr>
</tbody>
</table>

*Average rated conditions DNI (Direct Normal Irradiance) 5 kWh / m² / day

**Rated conditions at DNI 1000 W / m²**

A.T.E. is a value-driven and socially conscious organization that has served the nation’s needs for 80 years. A.T.E. firmly believes that sustainable development is possible only when corporates get involved in sustainable business practices. Through this passion and commitment, A.T.E. has invested in and developed technologies and products such as energy-efficient cooling solutions, effluent treatment, machine-to-machine solutions, and solar concentrators. These products enable our customers to meet their business and sustainability goals. A.T.E.’s commitment to the environment goes beyond its environment-friendly products and solutions to green work spaces and its green practices. Its latest facilities in Ahmedabad and Pune are IGBC LEED ‘Gold’ certified for conforming to the eco-friendly norms for buildings laid down by the Indian Green Building Council (IGBC).
Fully automated moving-focus paraboloid concentrator technology

Process flow integration

Feed water tank

Feed water

Steam

A.T.E. solar concentrator

Back-up boiler (optional)

Steam

Steam accumulator

Applications

- Boiler feed water
- Clean-in-place
- Textile processing
- Distillation
- Cooking
- Laundry

Solar field schematic layout (all dimensions in metres)

In parallel rows

In honeycomb structure

Typical savings* for 100 m² installation

<table>
<thead>
<tr>
<th>Fuel type</th>
<th>Fuel savings/day</th>
<th>Cost of fuel, Rs./unit</th>
<th>Savings, Rs./day</th>
<th>CO₂ avoided, kg/day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity</td>
<td>341 kWh</td>
<td>Rs. 7/kWh</td>
<td>Rs. 2388</td>
<td>375 kg</td>
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<tr>
<td>LPG</td>
<td>28 kg</td>
<td>Rs. 65/kg</td>
<td>Rs. 1844</td>
<td>84 kg</td>
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<tr>
<td>Diesel</td>
<td>30 l</td>
<td>Rs. 57/l</td>
<td>Rs. 1705</td>
<td>95 kg</td>
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<tr>
<td>Coal</td>
<td>176 kg</td>
<td>Rs. 8/kg</td>
<td>Rs. 1408</td>
<td>325 kg</td>
</tr>
<tr>
<td>Furnace oil</td>
<td>32 l</td>
<td>Rs. 30/l</td>
<td>Rs. 971</td>
<td>100 kg</td>
</tr>
</tbody>
</table>

* At rated conditions
Our successes

“...A.T.E. Solar’s steam-based cooking solution not only eliminated our need of firewood, but also reduced cooking time and drudgery. The cooking staff now work in a clean environment and go home early to spend quality time with their families.”

Principal, Nareshwadi School, GVET, Dahanu, Maharashtra

“...Buying large quantities of diesel for our factory operations was a huge drain on our income, and slowly drove down the laundry’s profits. ...Fuel cost is now under control, thanks to usage of A.T.E. Solar’s thermal concentrator solution.”

Owner, Lakaki Dry Cleaners and Art Dryers, Margao, Goa

“A.T.E. Solar’s concentrator has helped improve my laundry's profitability by more than Rs. 25,000 per month.”

Owner, Snow White Drycleaners, Parbhani, Maharashtra

Industries

- Textile
- Dairy and Food
- Automobile
- Distillery
- Chemical
- Educational Institutions
- Pharmaceutical

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