New solar thermal components testing facility at Hyderabad can help India’s growing solar sector

A newly established Concentrated Solar Thermal (CST) based test rig facility at Hyderabad can help the growing solar industry in India to test capability and performance of solar thermal components like solar receiver tubes, heat transfer fluids, concentrating mirrors.

The facility set up by the International Advanced Research Centre for Powder Metallurgy and New Materials (ARCI), an autonomous institute of the Department of Science & Technology (DST), will validate solar thermal components such as solar receiver tubes, heat transfer fluids, concentrating mirrors, and AR coated glass tubes, etc. of the CST system in field conditions.

It will validate the indigenous components by parallelly comparing the performance (heat gain and heat loss properties) of the standard components with varying the operating parameters (e.g., flow rates of Heat Transfer Fluids (HTFs) operating temperature, pressures, etc.) and different DNI (Direct Normal Irradiance) conditions.

The development of solar thermal technologies for low and medium-temperature applications requires much attention of indigenous solar thermal components manufacturing facilities and cost-effective engineering designs because most of the solar thermal companies import solar thermal components, particularly from China and Europe.

In this regard, ARCI is working on the development of cost-effective solar receiver tubes, anti-reflective (AR) coated glass covers, nanostructured material-based thermic fluids, and durable reflective mirrors to enhance the performance and cutting down the cost of the solar thermal systems in India.

Apart from the development, the testing and validation of the components in real-field conditions are critical for the deployment of solar thermal technology. In order to cater to this need, ARCI has established a concentrated solar thermal-based single-axis parabolic trough test rig facility sponsored by the Technology Research Centre (TRC) project, DST, Govt. of India.

The parabolic-trough test rig facility has features for simultaneous testing of standard and indigenous solar receiver tubes. It has a thermic fluid-based closed-loop system which can operate between 50 to 350°C temperature range. It can conduct heat gain studies in real-field conditions with the actual measurement of solar irradiance condition and has an electrical heater support for measuring the actual heat loss of solar receivers at different operating temperatures.

ARCI’s test rig facility provides the performance of indigenously developed solar thermal components in real-field operating conditions, thus attracting greater interest from the industries. Recently, HPCL R&D, Bangalore, has sanctioned a project to ARCI for validating their indigenously developed heat transfer fluids with the comparison of a world-leading commercial product.