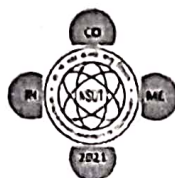


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Netaji Subhas University of Technology, Azad Hind Fauz Marg,
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New Delhi, India, November 25-26, 2021

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Submission link	https://easychair.org/conferences/?conf=income2021
Abstract registration deadline	March 1, 2021
Submission deadline	August 31, 2021

Topics: [thermal engineering and energy](#) [material engineering](#) [structural mechanics](#) [manufacturing and design](#)

The International Conference INCOME-2021 is aimed at providing a platform to the researchers and engineers to share and discuss various aspects of mechanical engineering and its application. Papers are also invited in all areas of engineering that influence mechanical engineering, and manufacturing. The conference provides an excellent opportunity for the presentation of new inventions, discoveries, implementations, improvements, product innovations and manufacturing. The conference is a right place for exchange of new ideas and transfer of knowledge. Keynote addresses by prominent researchers, workshops, poster presentations, technical sessions, and cultural programs are a few of the several features of the conference.

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- i. Title of the paper, authors, affiliations and email id
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- iii. Introduction – defining the paper topic, application and relevant literature review.
- iv. Body of the paper – analysis, mathematical model, numerical methods, experimental details
- v. Results and discussion
- vi. Conclusion
- vii. Acknowledgement etc. – if applicable
- viii. Notations
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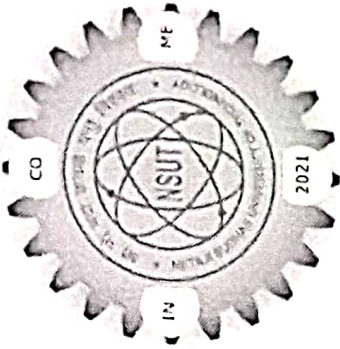
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Evacuated Tube Solar Collector Performance with Combined Effect of Triple Integrated Helix and Thermal Energy Storage

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Abstract. Evacuated Tube Solar Collectors (ETSC) are increasingly in use worldwide because of their high thermal efficiency and high working temperature. Being a passive system, its usage in rural areas are increasing. So, in order to improve the performance of ETSC, the heat pipe evacuated tube solar collector being utilized for experimentation. The insulated reservoir tank accommodating the manifold is provided with twisted tape and outside of manifold is completely filled with phase change material. Additionally, the parabolic reflectors are added to improve absorption of incident radiation on the evacuated tube over 360 degree. The experimentation will be performed with different flow rates 0.3, 0.5, 1 and 2 LPM of water. The performance with twisted tape shows improvement in temperature rise by 10°C in respect to normal ETSC. Due to addition of reflector, the performance could be further improved showing efficiency 24.5% at 2 LPM. The improvement in the efficiency could be quantified and plotted. Phase change material plays crucial role owing to which the fall in temperature in post noon session is in range of 5-8 degree only.

Keywords: Evacuated tube solar collector, parabolic reflector, solar water heater, twist tape, phase change material.

1 Introduction

A solar water heater which acts as an alternate and renewable energy source for water heating application. Evacuated tube solar water heating system is one of the most proven and effective method of solar thermal energy collection systems. The main constructional feature of ETSC is the heat pipe. The material used for heat pipe is a copper, owing to its better thermo-physical properties. The function of ETSC consist of absorbing the incident rays falling on the evacuated tube and heating of the primary working fluid in evacuated tube. This heated fluid rises against gravity and reach the transmission zone to distribute the heat to the secondary fluid. In order to increase the rate of heat transmission from primary working fluid to the secondary working fluid, the heat pipe has a bulb like protruded part which is highly sensitive to rapid change in temperatures. In order to achieve maximum heat transfer different techniques were adopted by researchers. Thianpong et al. explains the procedure of inserting twisted tape as a swirling flow generation for more heat transfer enhancement and obtained 86.7% heat transfer with respect to plain tube [1]. Chai et al. performed experiments on ETSC with inner

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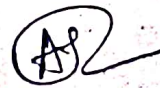
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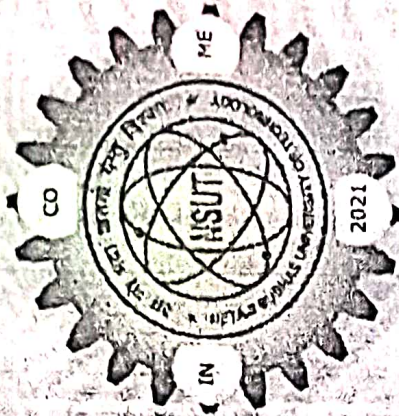
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Evacuated Tube Solar Collector Performance with Combined Effect of Triple Integrated Helix and Thermal Energy Storage

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Abstract

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Patel, V.D., Churi, A., Davane, S., Dhangar, A., Patil, A., Chaudhari, A.J. (2023). Evacuated Tube Solar Collector Performance with Combined Effect of Triple Integrated Helix and Thermal Energy Storage. In: Mishra, D.P., Dewangan, A.K., Singh, A. (eds) Recent Trends in Thermal and Fluid Sciences. Lecture Notes in Mechanical Engineering. Springer, Singapore. https://doi.org/10.1007/978-981-19-3498-8_16

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DOI	Published	Publisher Name
https://doi.org/10.1007/978-981-19-3498-8_16	05 November 2022	Springer, Singapore

Print ISBN	Online ISBN	eBook Packages
978-981-19-3497-1	978-981-19-3498-8	Engineering Engineering_(R0)

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