Dharamveer Singh

Optimizing Thermal Behavior of Compact Heat Exchanger

Thermal Behavior Analysis

Director
R.D. Engineering College
Duhai, Ghaziabad

LAP LAMBERT Academic Publishing

One of the key aspects of industrial machines, devices, and processes is heat transfer to maintain their functionality and achievements for better product quality. Therefore, various types of heat exchangers are involved to remove heat and maintain desired operating temperatures. However, to determine the requirement of space the size of a heat exchanger is matters (i.e. dimensions) of the machine/device or plant treatment. The objective of this study is to design theoretically analyze, then optimize performance using CFD. The theoretical study using the LMTD method for concurrent heat exchange is done, while the pressure drops and energy consumption are calculated using the Kern method. In this study, CFD ANAYALSIS THREE CASES analyzed the behavior of heat transfer, mass flow rates, pressure drops, flow rates, and eddies of tube bundle currents in the heat exchanger. The theoretically and CFD-based analysis is shown on only 1.15% in terms of hot fluid cooling performance. Overall, the results of this study confirm that CFD modeling can hold promise for heat exchanger design and optimization, allowing you to test many design options without building physical prototypes.

Dr. Dharamveer Singh, I Have Ph.D. in Mech. Engg in 2022, from Delhi Technological University, Delhi, India-110042. prior to that, I did my M.Tech in Thermal Engg. from Rajasthan Technical University Kota, Rajasthan, India, and B.Tech in Mech. Engg. from Delhi Technological University (Formerly Delhi College Of Engg.) Delhi, India -110042.

9 786204 955254

Director
R.D. Engineering College
Duhai, Ghaziabad

[SMMET-59]

Energy Matrices and Life Cycle Conversion Analysis of N-Identical Hybrid Double Slope Solar Distiller Unit Using Al_2O_3 Nanopaticles

Dharamveer Singh[1,2] Yagesh Kumar[2], Ashok Kumar Yadav[3], Mohd. Akram[2]

[1]Research Centre, M. R. D. Trust, Modinagar, Ghaziabad, U.P., India-201201

[2]Department of Mechanical Engineering, R D Engineering College, Ghaziabad, U.P., India-201206

[3]Department of Mechanical Engineering, R.K.G.I.T, Ghaziabad, U.P., India-201003

ABSTRACT

Present work shows the energy matrices analysis and life cycle conversion efficiency (LCCE) of a double slope solar desalination unit (DSDU) coupled with N-identical photovoltaic thermal compound parabolic concentrator collector (N-CPC) with a helically coiled heat exchanger using Al2O3 nanoparticles. The analysis is annually based on the atmospheric situation of New Delhi with the help of analytical program fed in MATLAB. The input data required for the numerical computations have been taken from IMD, Pune, India. The average value of annual energy output will be computed based on the energy and exergy followed by the evaluation and found annual yield is 8.5%, energy payback time is 16.16%, energy payback factor is 13.91%, and life cycle cost conversion efficiency is 7.15% greater. Therefore it is obvious the proposed system is better on the basis of following parameters i.e. annual yield, energy matrices, energy payback time (EPT), energy payback factor (EPF), and Life cycle cost conversion efficiency (LCCE) than previous system. The proposed hybrid system can be met the future requirement of potable water as well as electricity.

Keywords: *Energy matrices, Energy payback time, Energy production factor, life cycle conversion efficiency, Al2O3 nanoparticles*

Director
R.D. Engineering College
Duhai, Ghaziabad

Raj Kumar Goel Institute of Technology, Ghaziabad

5th km stone, Delhi-Meerut Road, Ghaziabad

SMMET

SMMET-2022

1st INTERNATIONAL CONFERENCE ON SUSTAINABLE MATERIALS, MANUFACTURING AND ENERGY TECHNOLOGIES

This is to certify that Mr./Ms./Dr./Prof. **Dharamveer Singh** has presented a paper titled **Experimental Studies on Utilization of Biogas with Biodiesel/Diesel Blends in a CI Engine** in the 1st International Conference on Sustainable Materials Manufacturing and Energy Technologies held on 24th to 25th June 2022, organized by Department of Mechanical Engineering, Raj Kumar Goel Institute of Technology Ghaziabad (UP)-201003, India.

Dr. Ashok Kr. Yadav
(Convener & HoD MED)

SMMET 2022

Dr. D. R. Somashekar
(Director)

Director
R.D. Engineering College
Duhai, Ghaziabad

Raj Kumar Goel Institute of Technology, Ghaziabad

5th km stone, Delhi-Meerut Road, Ghaziabad

SMMET

SMMET-2022

1st INTERNATIONAL CONFERENCE ON SUSTAINABLE MATERIALS, MANUFACTURING AND ENERGY TECHNOLOGIES

This is to certify that Mr./Ms./Dr./Prof. **Dharamveer Singh** has presented a paper titled **Energy Matrices and Life Cycle Conversion Analysis of N-Identical Hybrid Double Slope Solar Distiller Unit Using Al_2O_3 Nanoparticles** in the 1st International Conference on Sustainable Materials Manufacturing and Energy Technologies held on 24th to 25th June 2022, organized by Department of Mechanical Engineering, Raj Kumar Goel Institute of Technology Ghaziabad (UP)-201003, India.

Dr. Ashok Kr. Yadav
(Convener & HoD MED)

SMMET 2022

Director
R.D. Engineering College
Duhai, Ghaziabad

Dr. D. R. Somashekar
(Director)

I^st International Conference on Sustainable Materials, Manufacturing & Energy Technologies (SMMET-2022) June, 24-25 2022

[SMMET-58]

Environeconomic and Exergoeconomic Analysis of N-Identical Hybrid Double Slope Solar Distiller Unit Using Al_2O_3Nanoparticles

Dharamveer Singh[1,2], Gaurav Sharma[2], Ashok Kumar Yadav[3], Yagesh Kumar[2]

[1]Research Centre, M. R. D. Trust, Modinagar, Ghaziabad, U.P., India-201201

[2]Department of Mechanical Engineering, R D Engineering College, Ghaziabad, U.P., India-201206

[3]Department of Mechanical Engineering, R.K.G.I.T, Ghaziabad, U.P., India-201003

ABSTRACT

Present study represents the environeconomic and exergoeconomic analysis of a double slope solar desalination unit (DSDU) coupled with N-identical compound parabolic concentrator collector (N-CPC) with helically coiled heat exchanger using Al2O3 nanoparticles. The analysis is observed for a yearly based for the atmospheric situation of New Delhi with the help of analytical program fed in MATLAB. The input data required for the mathematically calculation has been taken from Indian Metrological Department, Pune, India. The average value of annual energy output will be computed based on the energy outputs of summer and winter seasons followed by the evaluation of economic, enviroeconomic and exergoeconomic for the system and compared with previous system. Furthermore, based on annual as well as life of 15 and 20 years it is found 8.5% greater yield, annual exergy 7.31% greater, CO2 mitigation/ton energy 3.9% and 2.85% less, annual productivity 5.17% greater, and exergoeconomic parameter 4% greater respectively. It will be concluded that the proposed system is better than other system based on energy enviroeconomic and exergoeconomic parameters.

Keywords: *Economic, Environ-economic, Exergoeconomic, productivity, Al2O3 nanoparticles.*

Dharamveer Singh

An analytical study to estimate the cooling load of proposed building

Director
R.D. Engineering College
Duhai, Ghaziabad

LAP LAMBERT Academic Publishing

Continuous increase in atmospheric temperature because of global warming has caused a reduction in human comforts and to cope with increasing global temperature or to achieve the previous level of comforts huge spending has to be done in form of Air conditioning devices. To solve the above-aforementioned problem, we have two alternatives Electrical air conditioning and central air conditioning but electrical air conditioning will further increase the monetary spending because of its central air conditioning's high-power consumption and shorter duration of life. On the other hand, the efficacious blueprint of the centralized system of an air conditioner or instead chilling section will provide low consumption of electricity, minimal capital cost and will improve the comeliness of a building. Central air conditioning can even solve the problem of oversizing and under-sizing of the cooling system. So, with the help of a proposed building layout and taking into account all possible heat sources such as heat gain by the individual, heat gain by the fluorescent lamp, infiltration, and heat gain by ventilation and with all possible heat source all types of heat is taken into account.

Dr. Dharamveer Singh, Ph.D. in Thermal Engg. from Delhi Technological University, Delhi, India-110042, I did M.Tech in Thermal Engg. from Rajasthan Technical University, Kota, Rajasthan, India, and B.Tech in mech Engg., from Delhi Technological University, Delhi, India-110042. I have Fifteen Years of Teaching Experience.

9 786204 977454

Director
R.D. Engineering College
Duhai, Ghaziabad

Physical and Biological Sciences: Know- how Social Solicitation

Editors
Mridula Tripathi
Arti Srivastava
Kalpana Awasthi
Hemlata Pant
Priyanka Chawla

2022

Krishna Computer Sansthan
Prayagraj

ISBN: 978-81-956345-9-0

Published by
Krishna Computer Sansthan
63/59, Mori, Daraganj
Prayagraj – 211006 (U.P.)
Contact +91-9450407739
Email: krishnacomputersansthan@gmail.com

Physical and Biological Sciences :
Know- how Social Solicitation

Editors : Mridula Tripathi, Arti Srivastava, Kalpana Awasthi
Hemlata Pant, Priyanka Chawla

First Edition: 2022

Price: 699/-

Printed by
Infinity Imaging Systems
New Delhi

Physical and Biological Sciences: Know- how Social Solicitation
Editors : Mridula Tripathi, Arti Srivastava, Kalpana Awasthi, Hemlata Pant, Priyanka Chawla
ISBN : 978-81-956345-9-0
Edition : 2022

Quality Assessment of Drinking Water at Moradabad, Uttar Pradesh (India): A Mathematical Approach

D.K. Sinha[1] and Gaurav Kumar Rastogi[2]
[1]Dept. of Chemistry, K.G.K.(P.G.)College,Moradabad-244001
[2]Dept. of Applied Science, R.D. Engineering College, Ghaziabad-201013
Email- dkskkgk@rediffmail.com,drgauravrdec@gmail.com

Abstract

The water quality index (WQI) is an important method for determining the water quality. Five different underground water sites of different public places at Moradabad, Uttar Pradesh were selected for collection of water samples for summer, rain and winter season in order to estimate different water quality parameters quantitatively .For calculating WQI the samples were subjected to a comprehensive physicochemical and biological analysis of 18 different parameters such as pH, conductivity, turbidity, alkalinity, hardness, total solids, total dissolved solids, dissolved oxygen, biological oxygen demand, chemical oxygen demand, free CO_2 fluoride, calcium, magnesium, zinc, iron, chloride and sulphate. Water samples from different India Mark II hand pump were collected and analyzed following standard methods and procedures of sampling and estimation. The water quality was found to be polluted with most of the parameters estimated for all the three periods. Comparison of calculated values of W.H.O. with standard assumptions revealed that underground water of study area at all the sites of study is severely polluted for all the periods, however, a slight improvement in the water quality is notices in winter season The WQI index values ranged from 49 to 269. The WQI values from present study indicate that the water quality is very poor in some area of study.