



Volume 8

Number 4

Year 2022







Volume 8 Number 4 Year 2022

EDITOR-IN-CHIEF

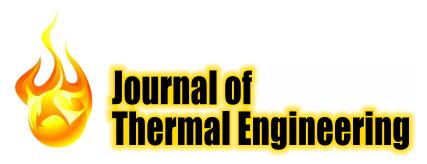
Ahmet Selim Dalkilic, Yildiz Technical University, İstanbul, Türkiye

ASSOCIATE EDITORS

Ali Celen, Erzincan Binali Yıldırım University, Erzincan, Türkiye Baha Zafer, İstanbul University, İstanbul, Türkiye Bekir Şener, Yildiz Technical University, İstanbul, Türkiye Erdal Çetkin, İzmir Institute of Technology, İzmir, Türkiye Emre Alpman, Marmara University, İstanbul, Türkiye Erman Aslan, İstanbul University, İstanbul, Türkiye Hasan Köten, İstanbul Medeniyet University, İstanbul, Türkiye Hatice Mercan, Yildiz Technical University, İstanbul, Türkiye Müslüm Arıcı, Kocaeli University, Kocaeli, Türkiye Mustafa Kılıç, Adana Science and Technology University, Adana, Türkiye Nader Javani, Yildiz Technical University, İstanbul, Türkiye Naime Filiz Özdil, Adana Science and Technology University, Adana, Türkiye Şevket Özgür Atayılmaz, Yildiz Technical University, Adana, Türkiye Tolga Taner, Aksaray University, Aksaray, Türkiye Özgen Açıkgöz, Yildiz Technical University, İstanbul, Türkiye Yakup Karakoyun, Hakkari University, Hakkari, Türkiye Yaşar İslamoğlu, Sakarya University, Sakarya, Türkiye Yasin Karagoz, İstanbul Medeniyet University, İstanbul, Türkiye Zerrin Sert, Eskişehir Osmangazi University, Eskisehir, Türkiye

EDITORIAL BOARD

Adrian Bejan, Duke University, United States
Afshin J. Ghajar, Oklahoma State University, United States
Ali Chamkha, Prince Mohammad Bin Fahd University, Saudi Arabia
Bekir Sami Yilbas, King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia
Chi-Chuan Wang, National Chiao Tung University, Taiwan
Gopal Nath Tiwari, Indian Institute of Technology, India
Hakan F. Oztop, Fırat University, Türkiye
Hari Mohan Srivastava, University of Victoria, Canada
Hamadiche Mahmoud, Université de Lyon 1, France
Hamid Niazmand, Ferdowsi University Of Mashhad, Iran





Volume 8 Number 4 Year 2022

Kambiz Vafai, University of California, United States
Karan Surana, The University of Texsas, United States
Mehmet Kanoğlu, University of Gaziantep, Türkiye
Mohammad Mehdi Rashidi, Bu-Ali Sina University, Iran
Mohammad Hassan Saidi, Sharif University of Technology, Iran
Muhammad Ali Rob Sharif, The University of Alabama, United States
Moh'd A. Al-Nimr, Jordan University of Science and Technology, Jordan
Mohsen Sheikholeslami, Babol Noshirvani University of Technology, Iran
Mustafa Turkyilmazoglu, Hacettepe University, Türkiye
N.K. Anand, Texas A&M University, United States
Omid Mahian, Xi'an Jiaotong University, Xi'an, China
Sergio Nardini, Seconda Università degli Studi di Napoli, Italy
Wei-Mon Yan, National Chiao Tung University, Taiwan

Abstracting and Indexing: Directory of Open Access Journals (DOAJ), EBSCO Host Online Research Databases, Web of Science, Emerging Sources Citation Index (ESCI), Scopus

Journal Description: The journal is supported by Yildiz Technical University officially, and is a blind peer-reviewed free open-access journal, published bimontly (January-March-May-July-September-November).

Publisher: Yildiz Technical University

Editor-in-Chief: Prof.Dr. Ahmet Selim Dalkılıç, dalkilic@yildiz.edu.tr

Language of Publication: English **Frequency:** Bimontly (6 issues per year)

Regular Issues: January (1) - March (2) - May (3) - July (4) - September (5) - November (6)

Publication Type: Online e-version

Journal of Thermal Engineering is supported by Yildiz Technical University officially, and is a blind peer-reviewed free open-access journal, published bimontly. • Journal of Thermal Engineering is a peer reviewed open access journal established as an origin for research in Heat Transfer and Thermodynamics mainly. • Journal of Thermal Engineering make every effort to ensure the accuracy of all the information (the "Content") contained in our publications. However, Journal of Thermal Engineering, our agents, and our licensors make no representations or warranties whatsoever as to the accuracy, completeness, or suitability for any purpose of the Content. Any opinions and views expressed in this publication are the opinions and views of the authors, and are not the views of or endorsed by Journal of Thermal Engineering. The accuracy of the Content should not be relied upon and should be independently verified with primary sources of information. Journal of Thermal Engineering shall not be liable for any losses, actions, claims, proceedings, demands, costs, expenses, damages, and other liabilities whatsoever or howsoever caused arising directly or indirectly in connection with, in relation to, or arising out of the use of the Content.





Volume 8 Number 4 Year 2022

CONTENTS

Rosparch Articles	_				
		 	L /	L months in	-1-

- 457 Comparative study of biodiesel production from different waste oil sources for optimum operation conditions and better engine performance

 Wadhah H. Al DOORI, Obed M. ALI, Ahmed H. AHMED, Hasan KOTEN
- 466 Combined heat pump heating and ventilation system using heat of soil, sewage water and ventilation emissions

 Mykhailo Serhii OSLOVSKYI, Serhii OSLOVSKYI
- 477 Performance improvement methods for quartz tube solid particle fluidized bed solar receiver Mehmet BÖLÜK, Senem ŞENTÜRK LÜLE
- 490 Refrigerant progression an investigation into eco-sustainability with evolution and viability of fourth generation refrigerants

 Salma KHATOON, Munawar NAWAB KARIMI
- A numerical evaluation on the utilization of earth to air heat exchangers in arid regions Algeria

Abdelmadjid KADDOUR, Mohammed El Hadi ATTIA, Müslüm ARICI, Khalfallah BENBELGACEM, Zied DRISS

- A critical re-examination of Reynolds analogy for micro-convective flow Rajan KUMAR
- Heat transfer analysis using a duct filled with metal foams

 Abhisek BANERJEE, Diplina PAUL
- Effect of the position of the hot source on mixed convection in a rectangular cavity

 Tewfik SEREIR, Abdelkrim MISSOUM, Brahim MEBARKI, Mohammed ELMIR, Mohamed DOUHA
- Experimental investigation of thermal comfort performance of a radiant wall and ceiling panel system

Ahmet DOĞAN, Nurullah KAYACI, Hakan DEMİR, Mustafa Kemal SEVİNDİR

Review

A critical assessment of the implementation of phase change materials in the VCC of refrigerator

Manish S. DESHMUKH, Dheeraj S. DESHMUKH, Sandip P. CHAVHAN