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(ICRTME -2025)

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Dr. C. Dhanasekaran

Professor, Department of Mechanical Engineering

Vels Institute of Science Technology and Advanced Studies (VISTAS)

Dr. R.Sridhar

Professorand Head, Department of Mechanical Engineering

Vels Institute of Science Technology and Advanced Studies (VISTAS)

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Dr. M. Chandrasekaran

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The Department of Mechanical Engineering at VISTAS was established in 2009, following the university's Deemed status in 2008. Since then, it has grown into a center of academic excellence and multidisciplinary research, combining traditional mechanical principles with emerging technologies. Functioning under the School of Engineering, the department emphasizes a balance of theory, practice, and research that prepares students for global professional challenges. The department's expertise spans thermal engineering, fluid mechanics, materials science, robotics, sustainable manufacturing, and design engineering, with active work in nanotechnology, additive manufacturing, energy systems, and smart manufacturing. Students and researchers benefit from state-of-the-art laboratories, simulation facilities, and advanced testing equipment, ensuring practice-oriented learning aligned with industry standards. Accredited by the National Board of Accreditation (NBA), the department maintains rigorous quality standards in education and research, assuring stakeholders of its curriculum relevance and the career readiness of its graduates. With a strong research culture, the department has published over 492 international research articles in reputed Scopus and Web of Science–indexed journals. It has also secured major externally funded projects worth a cumulative ₹3.77 crore, supported by agencies such as the Department of Science and Technology (DST) and CVRDE, reflecting its strength in defence, energy, and sustainable technology research. In line with national priorities for innovation, the department has contributed significantly to intellectual property, with 41 patents filed/published and 21 patents granted across areas like composites, energy systems, and automation.

The Department of Mechanical Engineering at VISTAS continues to blend academic rigor with industrial relevance and social responsibility, fostering a culture of innovation, entrepreneurship, and global collaboration. Its vision is to create engineers who can lead transformative changes in manufacturing, energy, and sustainable technologies, reinforcing its role as a hub of academic and research excellence.

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Casting and Analysis of Aluminium-Silicon Alloy with Copper

V. Gopal[1], S. Arunkumar[2]*, Alphin M S[3], R. Bharanidaran[4], A.Venkatesh[5]

[1]*Department of Mechanical Engineering, KCG college of Technology, India*

[2]*Department of Mechanical Engineering, Vels Institute of Science, Technology & Advanced Studies (VISTAS), Tamil Nadu, India*

[3]*Department of Mechanical Engineering, Sri Sivasubramaniya Nadar College of Engineering, Tamil Nadu, India – 603110.*

[4]*Department of Design and Automation, School of Mechanical Engineering, Vellore Institute of Technology, Vellore, Tamil Nadu, India*

[5]*U.G Students Department of Mechanical Engineering,KCG college of Technology, India*

Corresponding author E-mail: arunkumar.se@vistas.ac.in

ABSTRACT

Aluminium silicon alloy has been used as a material for sliding components in automobiles, aviation and other applications. The seizure and wear resistance of aluminum alloy can be improved by adding copper particulates. Al-Si/copper composite is used as a self-lubricating material in various applications, where sliding parts are difficult to access for lubrication. The main objective of this work is to fabricate an Al-Si/copper composite with better mechanical and wear resistance properties. The aluminium silicon alloy reinforced with copper (3 wt.%) composite was prepared through the stir casting technique. In order to improve the wettability of copper with Al-Si alloy, copper particulates were ball milled and then incorporated into the molten metal. The uniform distributions of copper particulates are observed in the structural investigation of the alloy. The billet was cut into pieces of diameter 10 mm & 14 mm, respectively. It has a length of 25 mm and was sent for tests. The wear rate of the Al-Si alloy and Al-Si/copper composite was investigated. Corrosion-resistant and compressive properties of the alloy are better. The higher tensile properties of the alloy are due to the addition of Cu, which obstructs the dislocation movement. Corrosion and compressive properties of the alloy and composite are dependent on strain rates.

Keywords: Al-Si/copper composite; Sliding wear; Stir casting

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