IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 2, September 2025
Impact Factor: 7.67

Investigation on LED Flood Light Casing using Modelling Software SolidWorks

D. M. Shah[1], D. B. Jani[2], K. K. Bhabhor[3]
P.G. Scholar, ME (CAD/CAM), Department of Mechanical Engineering[1]
Associate Professor, Department of Mechanical Engineering[2]
Assistant Professor, Department of Mechanical Engineering[3]
Government Engineering College, Bhavnagar, Gujarat, India[2]
Government Engineering College, Dahod, Gujarat, India[1,3]
dishits99@gmail.com

Abstract: *This research investigates the thermal performance of an aluminium plate with dimensions of 319 mm × 299 mm × 4 mm using SolidWorks simulation software. Aluminium is selected due to its high thermal conductivity and low density, making it an ideal material for heat dissipation in mechanical and electrical systems. The study employs both steady-state and transient thermal analyses through the SolidWorks Simulation module. Boundary conditions include convective heat transfer on exposed surfaces, fixed temperature constraints, and applied heat sources to replicate realistic operating environments. The simulation results highlight critical regions of thermal concentration, particularly at the central portion of the plate where maximum temperatures are observed. To enhance thermal performance, plate geometry optimization was applied. After optimization, the maximum temperature decreased from* ***92.3 °C to 78.6 °C,*** *reflecting a* ***14.8% improvement in thermal efficiency****. Furthermore, the maximum thermal gradient reduced by* ***11.2%,*** *while the overall heat flux uniformity improved by* ***13.6%,*** *indicating more effective heat dissipation across the surface. These improvements demonstrate the effectiveness of geometry and boundary optimization in enhancing heat transfer. The findings confirm that strategic modification of plate design can significantly improve thermal management capabilities, thereby contributing to the development of efficient cooling solutions for mechanical and electrical systems exposed to elevated thermal loads.*

Keywords: Thermal performance, Aluminium plate, Heat dissipation, Thermal conductivity, SolidWorks Simulation

DOI: 10.48175/IJARSCT-29023