

International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)

International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal

Volume 4, Issue 1, December 2024

The Development of Fire-Tube Steam Boiler in Laboratories

Jigar Shinde, Shreyas Gade, Abhay Raut, Amit Raut, Subodh Bhagat

Department of Mechanical Engineering Dr. Rajendra Gode Institute of Technology & Research, Amravati, Maharashtra, India

Abstract: The fire-tube steam boiler remains an essential tool in laboratory environments, offering a practical platform for teaching thermodynamics and conducting heat transfer research. This article explores the development of a compact fire-tube boiler tailored for laboratory use, emphasizing safety, efficiency, and adaptability. Key design elements include corrosion-resistant materials, modular construction, and advanced automation systems featuring IoT integration. The study also highlights future directions, such as the adoption of renewable fuels, AI-driven control systems, and eco-friendly innovations to enhance sustainability. Despite its advantages, challenges persist, including fuel versatility, thermal efficiency optimization, and cost constraints. Addressing these challenges through ongoing research will ensure the boiler's continued relevance in education and research, bridging theoretical knowledge with practical applications

Keywords: fire-tube steam boiler

