**DESIGN OF BIOGAS PLANT INCORPORATING WATER JACKET IN DIGESTER TANK **

**INNOVATIVE DESIGN PROJECT - II**

**A PROJECT REPORT**

***Submitted by***

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***in partial fulfillment for the award of the degree***

***of***

**BACHELOR OF ENGINEERING**

***in***

**CIVIL ENGINEERING**

**k.RAMAKRISHNAN COLLEGE OF TECHNOLOGY**

(An Autonomous Institution, affiliated to Anna University Chennai and Approved by AICTE, New Delhi)

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**DEC, 2024**

**K.RAMAKRISHNAN COLLEGE OF TECHNOLOGY**

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**BONAFIDE CERTIFICATE**

Certified that this project report titled **“DESIGN OF BIOGAS PLANT INCOPORATING WATER JACKET IN DIGESTER TANK ”** is the bonafide work of **DHANSSREE U K (811721103008), PRIYADHARSHINI P (811721103031)**who carried out the project under my supervision. Certified further, that to the best of my knowledge the work reported herein does not form part of any other project report or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

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**DECLARATION**

We jointly declare that the project report on **“DESIGN OF BIOGAS PLANT INCOPORATING WATER JACKET IN DIGESTER TANK”** is the result of original work done by us and best of our knowledge, similar work has not been submitted to **“ANNA UNIVERSITY CHENNAI”** for the requirement of Degree of **BACHELOR OF ENGINEERING**. This project report is submitted on the partial fulfilment of the requirement of the award of Degree of **BACHELOR OF ENGINEERING**.

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**ABSTRACT**

A biogas plant is a facility that converts organic waste materials like agricultural residues, animal manure, food scraps, and sewage into biogas through anaerobic digestion. This process involves the breakdown of organic matter by bacteria in an oxygen-free environment, producing a mixture of gases, primarily methane and carbon dioxide, known as biogas. The biogas generated can be used as a renewable energy source for cooking, heating, electricity generation, and even as vehicle fuel after purification. Biogas plants consist of a digester, a gas holder to store the biogas, and facilities for managing the leftover digestate, which can be used as organic fertilizer.Biogas plants provide a clean, renewable energy source, reduce greenhouse gas emissions, and create nutrient-rich byproducts for agriculture. They are essential components of sustainable energy and waste management systems. Biogas is distinct from other renewable energies because it uses, controls, and collects organic waste while also producing fertilizer and water for agricultural irrigation. It does not have geographical limitations or require advanced technology for producing energy, and it is simple to use and apply.The design of a biogas plant incorporating a water jacket in the digester tank is an innovative approach aimed at enhancing the efficiency and stability of the anaerobic digestion process. The water jacket serves as a temperature regulation mechanism, surrounding the digester tank and maintaining a consistent temperature within the digester. This helps avoid temperature fluctuations caused by external environmental changes, improving microbial activity and resulting in higher gas yields and a more stable biogas production process. The water within the jacket can be heated through solar energy or waste heat recovery, making the system more energy-efficient and environmentally sustainable.

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**LIST OF SYMBOLS AND ABBREVIATIONS**

**SYMBOLS**

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**ABBREVIATIONS**

|  |  |  |
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| RPM | - | Revolutions Per Minute |