

**DESIGN AND DEVELOPMENT OF A LIQUEFIED PETROLEUM
GAS (LPG) LEAK DETECTION DEVICE USING FUZZY LOGIC
METHOD BASED ON INTERNET OF THINGS (IoT)**

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ABSTRACT

Liquefied Petroleum Gas (LPG) is a primary energy source in daily life, especially for cooking. Data from sensors are processed using fuzzy logic, enabling decision-making based on membership degrees for safe, alert, and danger conditions. If the gas reaches the danger level, the system activates a buzzer, closes the solenoid valve, turns on the fan, and sends a real-time notification via Telegram. NodeMCU ESP8266 is used for IoT connectivity, allowing users to remotely monitor the condition. Test results show that the system can accurately detect leaks and respond quickly at tested distances ranging from 10 cm to 1 meter. Through this design, results were obtained from several sensor calibration trials. The gas concentration value from the TGS2610 sensor is categorized into three leakage levels: low (0–2500 PPM), medium (2500–8500 PPM), and high (8500–10000 PPM). Meanwhile, the MQ-6 sensor values are categorized as low (0–230 PPM), medium (230–450 PPM), and high (450–500 PPM). The integration of fuzzy logic and IoT produces a system capable of improving user safety in addressing potential LPG leaks.

Keywords: *Fuzzy logic, internet of things, Telegram, leak detection.*