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(57) Abstract :

This proposed system presents the development of a PID-based temperature controller for a bitumen plant aimed at optimizing the temperature regulation process, improving energy efficiency, and enhancing operational reliability. The controller utilizes a Proportional-Integral-Derivative (PID) algorithm to maintain precise and stable temperatures during various bitumen processing stages, ensuring product quality and process consistency. By dynamically adjusting heating and cooling systems, the controller reduces energy consumption and operational costs while minimizing the risk of temperature-related faults. Additionally, the system includes features for fault detection and diagnostic capabilities, enabling proactive maintenance and reducing downtime. The controller is designed to be highly adaptable, offering customization for different plant sizes and integrating seamlessly with existing automation systems for real-time monitoring and data analysis. This innovation not only improves the efficiency of bitumen processing but also enhances safety, compliance with industry standards, and the overall sustainability of plant operations.

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