

STANDARDIZING PROPORTIONAL, INTEGRAL AND DERIVATIVE PARAMETERS OF BALLOON BLOWING MACHINE IN MANUFACTURING PERCUTANEOUS TRANSLUMINAL CORONARY ANGIOPLASTY MEDICAL BALLOONS

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ABSTRACT

The study emphasizes the crucial standardization of PID parameters - Proportional, Integral, and Derivative to optimize diverse industrial processes. Focusing on balloon manufacturing, particularly in the production of Percutaneous Transluminal Coronary Angioplasty (PTCA) medical balloons, the research centered around into balloon blowing machines. These machines intricately manufacture balloons from heated thermoplastic tubes, emphasizing precise stretching and controlled inflation via nitrogen pressure. Fine-tuning PID parameters within the machine's control system is vital for achieving desired balloon properties. The research systematically explores PID configurations, including P, PI, and PID controllers, tailored for specific process control needs. Through rigorous experimentation, the study identifies optimal combinations of Proportional, Integral, and Derivative parameters. By precisely adjusting these parameters, the research enhances the machine's efficiency, accuracy, and productivity in producing high-quality PTCA balloons. This research not only advances process control knowledge but also holds practical significance for industries reliant on precise manufacturing. The findings provide essential guidance for engineers, researchers, and practitioners in similar setups, illuminating the intricate interplay of PID parameters. Therefore, the present research study elevates understanding in PID parameter standardization, promising heightened efficiency and productivity, particularly in critical fields like medical device manufacturing.

KEYWORDS: *Proportional, Integral and Derivative, Balloon Manufacturing, PTCA Balloons, Process Control and Optimal Configuration*

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