

## Effect of Film Cooling on Gas-Turbine Engine Turbine

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**Abstract :** Gas turbine engines, crucial for modern aviation and power generation, rely on the efficient operation of turbine blades. However, extreme temperatures and pressures can lead to material degradation and failure. Film cooling, a widely employed technique, injects a coolant onto the blade surface to mitigate the effects of hot gas exposure. This research investigates the impact of film cooling on gas turbine engine performance, focusing on its influence on efficiency, longevity, and overall engine performance. Through a comprehensive literature review, computational fluid dynamics simulations, and thermal performance analysis, this study aims to provide insights into optimizing film cooling configurations for enhanced engine performance. The research explores the thermal performance characteristics of turbine blades with and without film cooling, the influence of various film cooling techniques on engine efficiency, and the design factors that optimize film cooling effectiveness. The findings of this study have the potential to contribute to the development of more efficient and reliable gas turbine engines, ultimately advancing the field of gas turbine technology.

**Keywords :** gas turbine, engine, cooling, blade, optimization

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