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Thermal Spray

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The Thermal Spray (Plasma) coating process is a widely adopted technique for enhancing the performance and durability of critical engine parts, offering superior resistance to wear, corrosion and high-temperature environments. However, a recurring defect, delamination at the edges of test specimens, has been observed, where the coating separates from the substrate. This issue compromises the reliability of the coating process, making it unsuitable for aerospace and other high-performance applications.

This study focuses on investigating the root causes of delamination, examining factors such as substrate preparation, thermal stresses and process parameters. Using experimental trials, surface characterization and thermal modeling, the research explores how particle velocity, spray distance and substrate temperature influence coating adhesion.

The findings are expected to refine plasma spray methodologies, addressing delamination and enhancing coating reliability. This work will contribute to the development of more robust coatings for high-stakes applications while optimizing resource use and supporting the industry's goals for sustainability and efficiency.

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