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From Research to Industry: Thermography Applications and Case Studies

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In collaboration with Baker Hughes (BH) and the spin-off of Politecnico di Bari Diagnostic Engineering Solutions (DES), this study explores the application of thermographic non-destructive testing (NDT) techniques from research to industry, enabling detailed evaluation and monitoring of critical components and processes in advanced manufacturing. The effectiveness of nozzle cooling systems is assessed through transient thermal analysis, allowing detection of flow inhomogeneities and extraction of thermal features for qualitative evaluation of cooling performance. Active thermography is employed to evaluate coatings, providing non-invasive assessment of integrity, adhesion, and defect distribution while also enabling estimation of coating thickness to support quality control and process optimization. Thermal monitoring of the Laser Metal Deposition (LMD) process allows acquisition of detailed thermal maps that correlate with process parameters and mechanical properties of the material. Joint analysis of thermal distributions during the monitoring, microstructure, and mechanical properties facilitates early defect detection and comprehensive evaluation of final part performance. These thermographic approaches offer versatile tools for real-time monitoring, defect detection, and quality assurance, bridging the gap between research and industrial application.

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