

Applications Report: 3D Metrology Services for Automotive Components

Supercharger Vane Clearance Inspection Using High-Resolution 3D Scanning

Author: EDM Intelligent Solutions

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Executive Summary

As automotive performance technologies advance, components like supercharger vanes require increasingly precise dimensional control to ensure optimal airflow, mechanical clearance, and long-term durability. EDM Intelligent Solutions provides advanced, non-contact 3D metrology services that deliver micron-level form measurements for clearance and fit validation. This report outlines our inspection approach for a supercharger vane using the MVi5 3D Metrology Center.

Overview of 3D Metrology Capabilities

Using high-resolution 3D scanning technology, EDM Intelligent Solutions offers precise inspection of complex surfaces and geometries without the need for contact. Our metrology process slices through the 3D scan data to extract form dimensions including radii, angles, slot widths, and step heights—supporting both development and production quality control.

Key capabilities include:

- μm -scale resolution for clearance and gap measurement
- Profile slicing for dimensional analysis of curved and irregular features
- Non-contact measurement to prevent damage to lightweight components
- Digital reporting and traceable inspection records

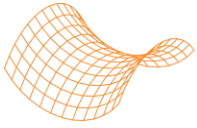
Application Case Study: Supercharger Vane Clearance Inspection

Component Overview

- Type: Supercharger Vane
- Material: Aluminum
- Metrology System: MVi5 3D Metrology Center
- Metrology Service: Form Measurement and Clearance Validation

Clearance Inspection Process

The aluminum supercharger vane was scanned using the MVi5 3D Metrology Center to capture a full digital representation of the part. Cross-sectional profiles were extracted from the scan to measure critical dimensions affecting vane clearance and performance.



Measurements included slot width, sidewall angle, and gap uniformity between mating components. The non-contact scanning ensured that no mechanical stress or deformation was introduced during the inspection process, preserving component integrity.

Results & Value Delivered

- Precise clearance verification to support performance tuning
- Non-destructive inspection ideal for lightweight aluminum parts
- Increased confidence in fit and mechanical tolerance compliance
- Support for design validation and root cause analysis in development programs

Conclusion

High-resolution 3D metrology is essential for ensuring the functional integrity of precision automotive components like supercharger vanes. EDM Intelligent Solutions delivers accurate, repeatable, and damage-free clearance inspections using state-of-the-art scanning technology, empowering engineers with the data needed to make informed design and quality decisions.

About EDM Intelligent Solutions

EDM Intelligent Solutions provides advanced electrical discharge machining and 3D metrology services to the automotive, aerospace, and medical sectors. Our integrated manufacturing and inspection solutions ensure the highest level of quality and performance compliance.