EDM Intelligent Solutions
Manufacturing - Metrology

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Applications Report: 3D Metrology Services for Hydraulics
Roughness Inspection of Conical Surface in Hydraulic Valve Seat

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Executive Summary

Hydraulic systems rely heavily on precision-sealed surfaces such as valve seats, where surface finish plays a crucial role in system reliability and performance. EDM Intelligent Solutions delivers high-resolution, non-contact metrology services for roughness analysis of complex geometries, including conical sealing surfaces. This white paper details a surface roughness inspection case study using our MVi5 3D Metrology Center on a stainless-steel valve seat.

Overview of 3D Metrology Capabilities

Our advanced 3D metrology systems provide micron-level surface and form data without contacting or damaging the part. This is especially useful for hydraulic components, where wear and leakage resistance are tied directly to surface topography.

Key capabilities include:

- Non-contact roughness analysis at µm scale
- Accurate data acquisition on curved and conical surfaces
- Profile extraction and roughness parameter computation
- Quantitative metrics for quality control and traceability

Application Case Study: Conical Valve Seat Surface Inspection

Component Overview

- Type: Valve Seat
- Material: Stainless Steel
- Metrology System: MVi5 3D Metrology Center
- Metrology Services: Surface Roughness Measurement

Inspection Process

The valve seat’s conical surface was scanned with the MVi5 3D Metrology Center. Roughness profiles were extracted from the 3D scan to quantify Ra, Rz, and other texture parameters. The non-contact nature of the inspection preserved the part’s integrity while delivering precise surface data.

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Results & Benefits

- Detailed roughness map of conical sealing surface
- Confirmed surface finish within specification
- Eliminated need for destructive testing or replicas
- Improved confidence in sealing performance and reliability

Conclusion

Precision surface finish measurement is vital for high-performance hydraulic systems. EDM Intelligent Solutions' non-contact 3D metrology tools enable accurate inspection of complex conical features—critical for valve functionality and longevity.

About EDM Intelligent Solutions

EDM Intelligent Solutions is a provider of advanced metrology and manufacturing technologies. We serve clients in aerospace, medical, energy, and hydraulic sectors with world-class precision measurement and fabrication services.