Zero Defect Manufacturing - Ceramic Machining

Eric Norton – Bullen Ultrasonics

Ceramics Expo 2026

Booth# 528

ISO 9001/AS9100 CERTIFIED

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Bullen Ultrasonics Overview

- Machining of hard and brittle materials in aerospace, semiconductor, mems, medical,…
- 50+ years in manufacturing ceramics (silicon, glass, alumina, SiC, SiC/SiC-CMC and many more materials)





Achieving Zero Defect Manufacturing

Definition & Planning

- Focus on clear understanding of Requirements
- Create methods strategy
- DFMEA –Identify and Mitigate Risk
- Modeling and simulation
- Leverage SMEs and prior knowledge

Process Development

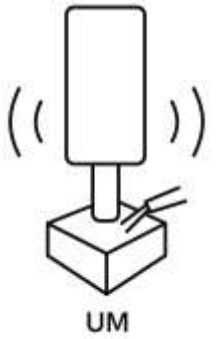
- Prioritize removing risk early
- Surrogate material substitution for high value products
- Establish Process Boundaries – DOEs
- Build risk protection into automation

Process Stability

- Control plans
- 5S, SPC, 6σ
- Preventative Maintenance
- AI-enabled optimization & trending
- Adaptive machining

Ceramics Manufacturing Methods

Ultrasonic Machining – No heat affected zone, no depth of damage, no re-cast layer, low force on the workpiece, no contact other than slurry



Laser Machining – High precision and high efficiency for some part configurations



Grinding – Can be a great choice for balancing material removal efficiency with surface finish requirements



Visit Booth #528

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