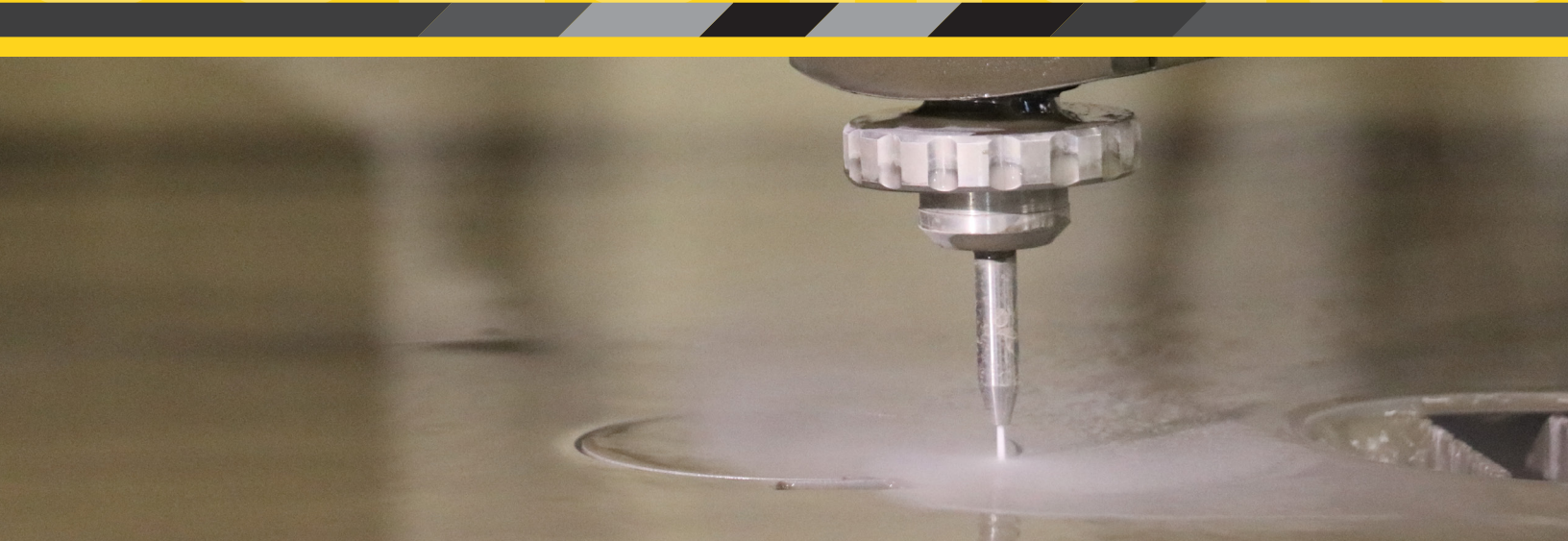


SOLUTIONS

ROCTEC™ Abrasive Waterjet Nozzles

COMPOSITE CARBIDE MIXING TUBES



ROCTEC™

Abrasive Waterjet Nozzles

Our exclusive ROCTEC™ line of abrasive waterjet nozzles is made from a unique carbide material and proprietary manufacturing process.

ROCTEC™ Composite Carbide: The Ultimate Wear Material

ROCTEC™ abrasive water jet (AWJ) nozzles are made from unique materials that have literally changed the definition of wear resistance. ROCTEC™ composite carbide is a tungsten carbide based material made using the proprietary Rapid Omnidirectional Compaction (ROC) process.

ROCTEC™ 100

Industry workhorse, fit-for-use performance

ROCTEC™ 500

Most trusted abrasive waterjet nozzle for consistent, accurate cutting

ROCTEC™ APX

Newest ROCTEC technology delivers peak precision and life





The preferred option when waterjet nozzles need to be:

Consistent.

Reliable.

Predictable.

ROCTEC™ Waterjet Nozzles

The ROCTEC™ process enables the combination of these advanced ceramic materials without the need for a soft metal binder, as is the case with tungsten carbide/cobalt using traditional sintering technology. The ROC process enables nozzles to be formed using very short consolidation cycles to minimize the natural tendency of ceramic particles to grow in size when exposed to high heat for long periods. Eliminating a metallic binder and maintaining extra-fine grain size both contribute to optimum nozzle performance. The result is an extremely durable material that fiercely resists abrasive and erosive wear.

- **Lowest total cost per hour used**
- **Up to 120 hours of precision cutting**
- **Up to 250 hours of rough cutting**
- **Faster cutting speeds**
- **Greater dimensional accuracy**
- **Longer uninterrupted cuts**
- **Greater performance and service life**
- **Predictability-nozzles perform the same every time**



The Industry Leader at Every Performance Level



ROCTEC™ APX

- Performance improvement of 20% or more above ROCTEC 500
- Longest, most reliable operating life in the industry
- Ideal for:
 - High Pressure Cutting
 - Precise, Uninterrupted Cuts
 - High Piercing Volume
 - Faster Cutting Speeds
 - Edge Quality Critical
 - Multiple Cutting Heads
 - Critical Components



ROCTEC™ 500

- Unparalleled performance for consistent and accurate cutting
- Long trusted industry standard for premium performance
- Ideal for:
 - High Pressure Cutting
 - Precise, Uninterrupted Cuts
 - Edge Quality Critical
 - Multiple Cutting Heads



ROCTEC™ 100

- Fit-for-use performance
- Industry workhorse used in general applications
- Ideal for:
 - Rough Cutting
 - Moderate to High Pressure Cutting
 - Non-Metallic Materials
 - Pure Waterjet

Resolute Performance for Over 30 Years

Focusing tubes, tubes, waterjet nozzles...However you describe them, ROCTEC Abrasive Waterjet nozzles have been the industry leader since the early days of waterjet cutting.

ROCTEC™



Advanced Material Structure

No soft metal binder and finer grain size enables maximum wear resistance.

Premier Quality

Highest diameter tolerance consistency from entry to exit bore in the industry

Highest Wear Resistance

Less bore growth at both entrance and exit contribute to longer operating life.

ROC Proprietary Process

Key to industry leading performance and unique to Kennametal's ROCTEC. This process generates the most consistent material structure available.



Industry Leading Material Technology



Consistent and Predictable Cutting



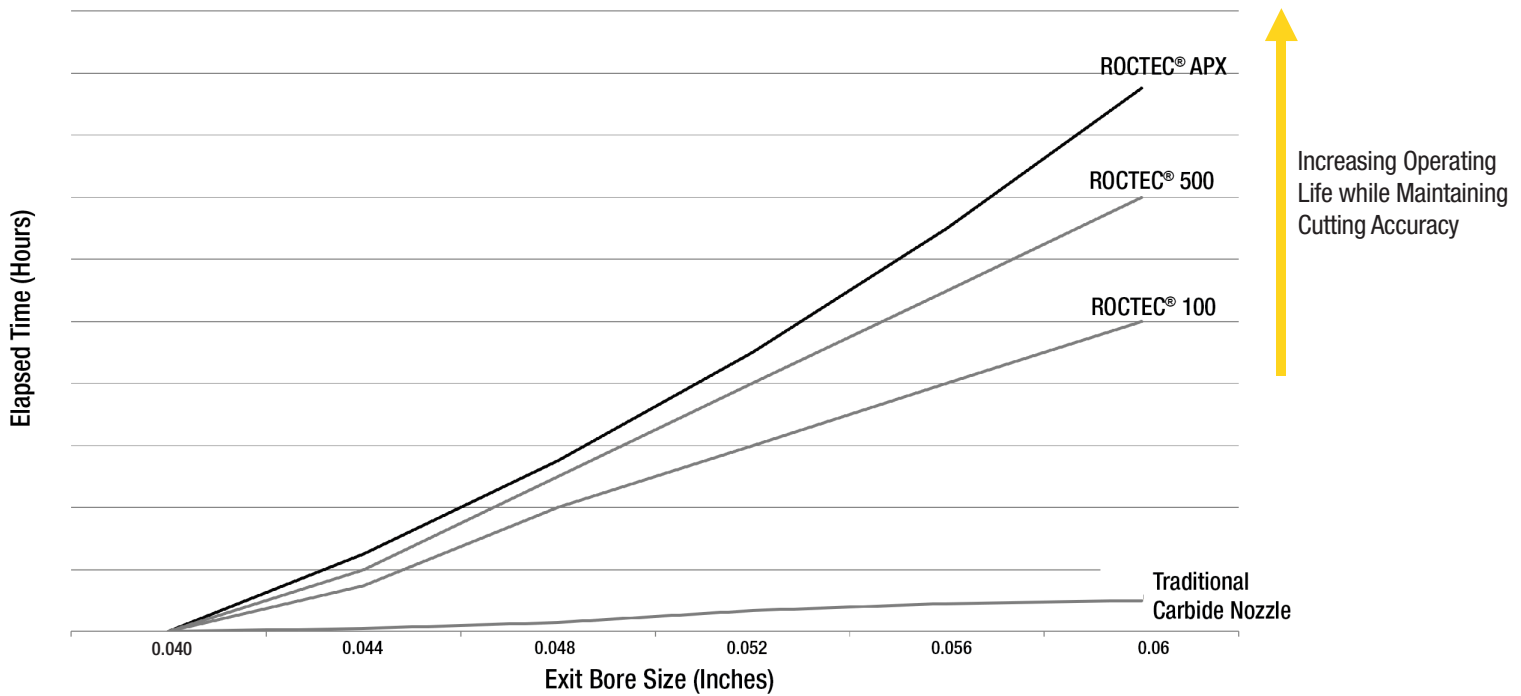
Longest Operating Nozzles Available



Lowest Overall Cost of Ownership



The Proof is in the Performance



Consistent

Uniform bore growth maintains identical cutting accuracy and tolerance for every nozzle.

Reliable

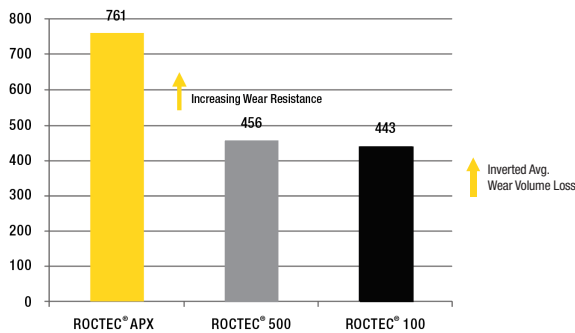
Eliminate premature nozzle failures and scrap parts due to performance.

Predictable

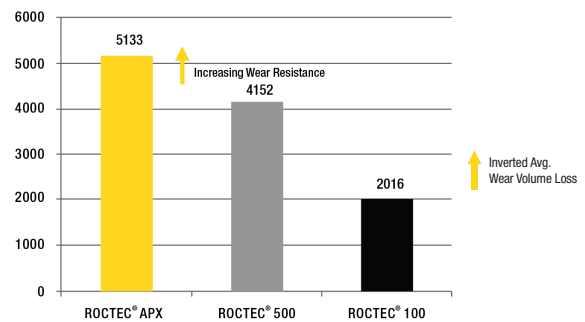
Nozzles maintain the same accuracy throughout repeated cut cycles.

Wear Resistance - The Critical Factor in Nozzle Performance

ASTM G65 - Dry Wheel Abrasion

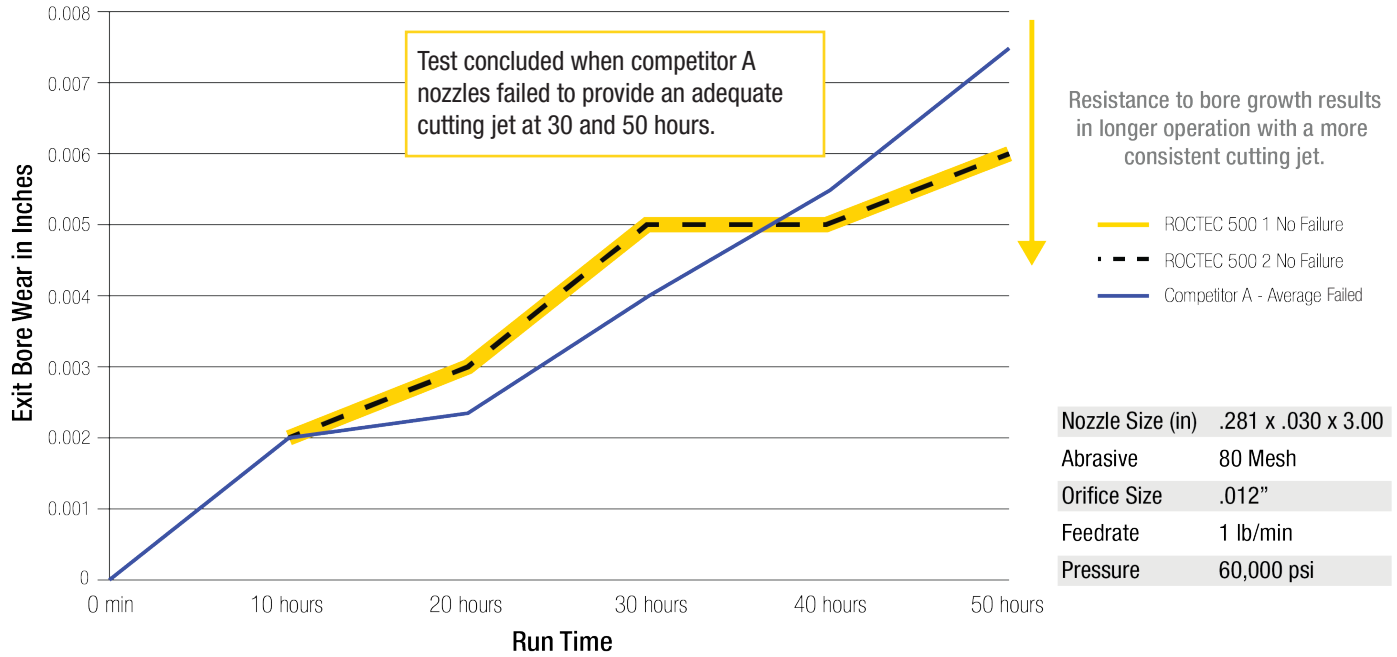


ASTM B611 - High Stress Abrasion

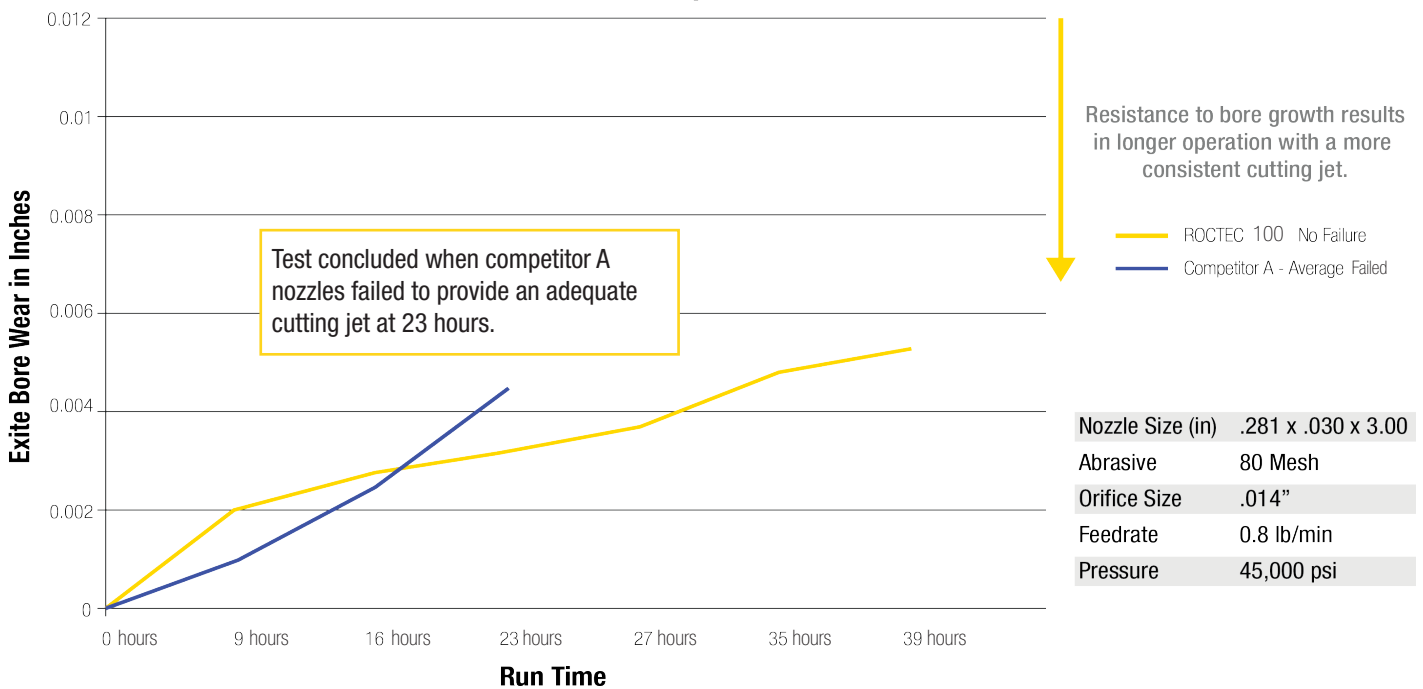


Exit Bore Growth Results of ROCTEC Abrasive Waterjet Nozzles vs. Competitors

ROCTEC™ 500 vs Competitor Premium

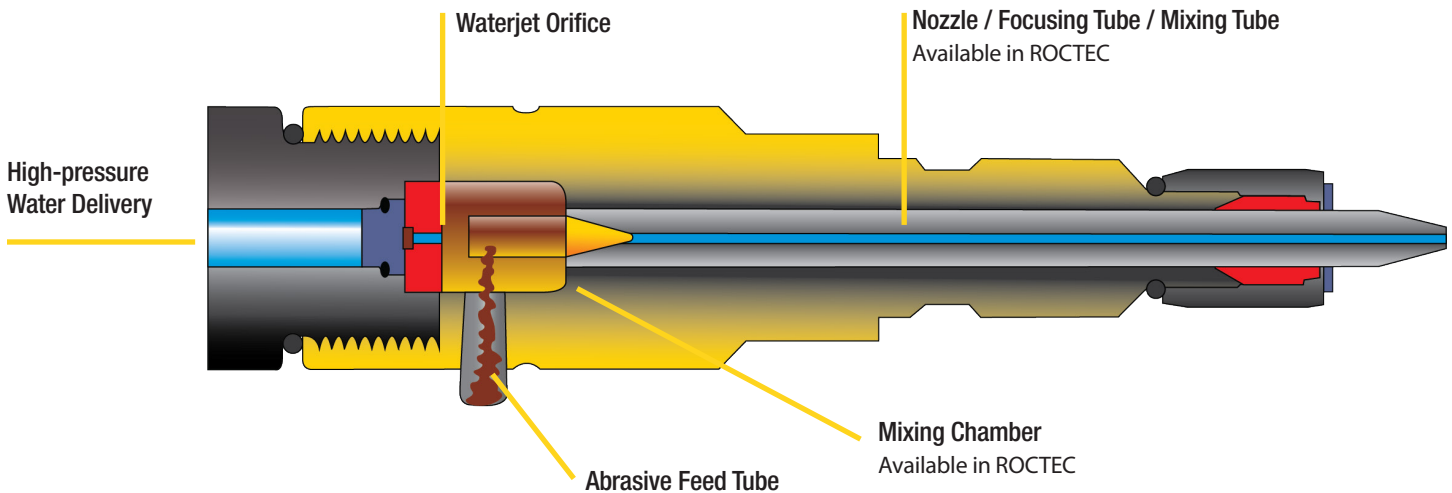


ROCTEC™ 100 vs Competitor Standard



Abrasive Waterjet Nozzles: The Mechanics

Key Cutting Head Components



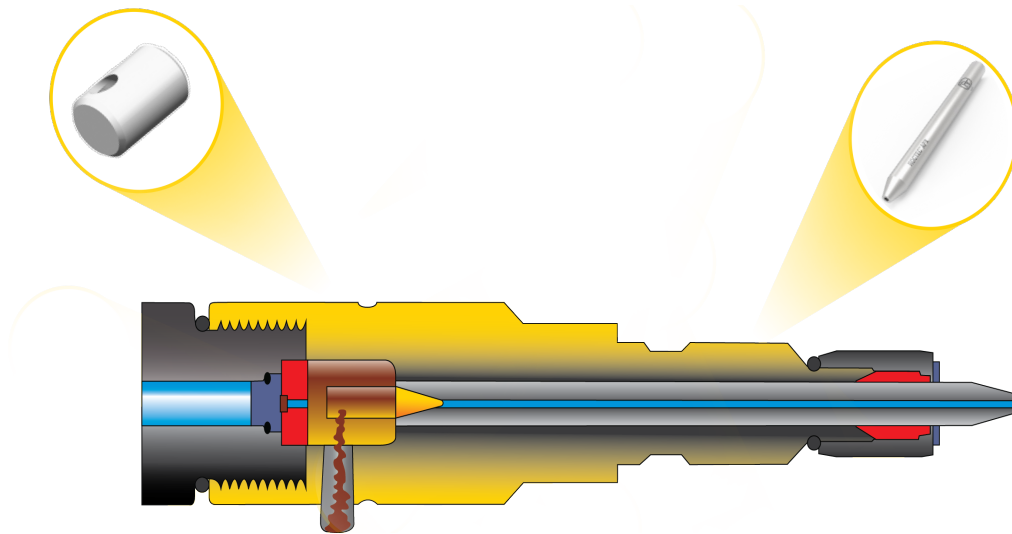
Best Practices to Achieve Optimal Life from ROCTEC Nozzles

- Inspect orifice for chipping, wear and/or buildup of dirt or abrasive
- Use mixing chamber components made from carbide or ROCTEC
- Verify water - orifice alignment prior to abrasive selection
- Precise alignment of the orifice and focusing tube ensures the jet is focused directly down the center of tube
- ROCTEC focusing tubes with precise alignment will allow the longest life and highest level of cutting quality

Applications Where ROCTEC™ Excels

Waterjet Cutting Applications

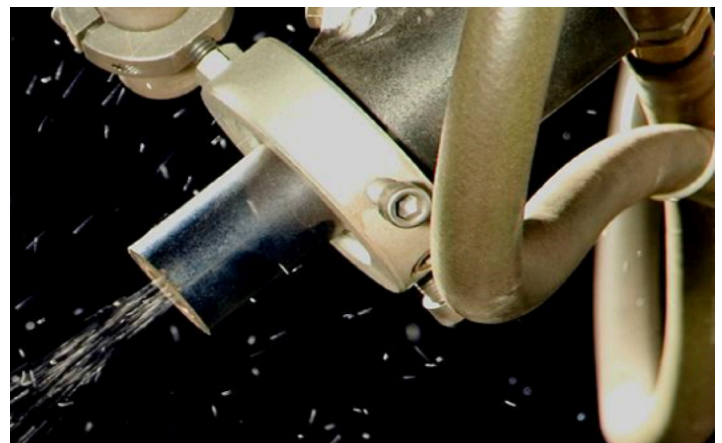
Any component in your system exposed to abrasive material and pressure can affect performance. ROCTEC material systems are the solution.



Other Applications:

- Sandblast Nozzles
- Descaling Nozzles
- Slurry Nozzles
- Centrifuge Nozzles
- Downhole Tools in Oil & Gas
- Separation Cups for Fluids & Solids

Kennametal Abrasive Blast Nozzles



Speak to a Kennametal representative today to learn more about our line of products for Abrasive Blasting.



ROCTEC® WATERJET NOZZLES CENTER OF EXCELLENCE

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