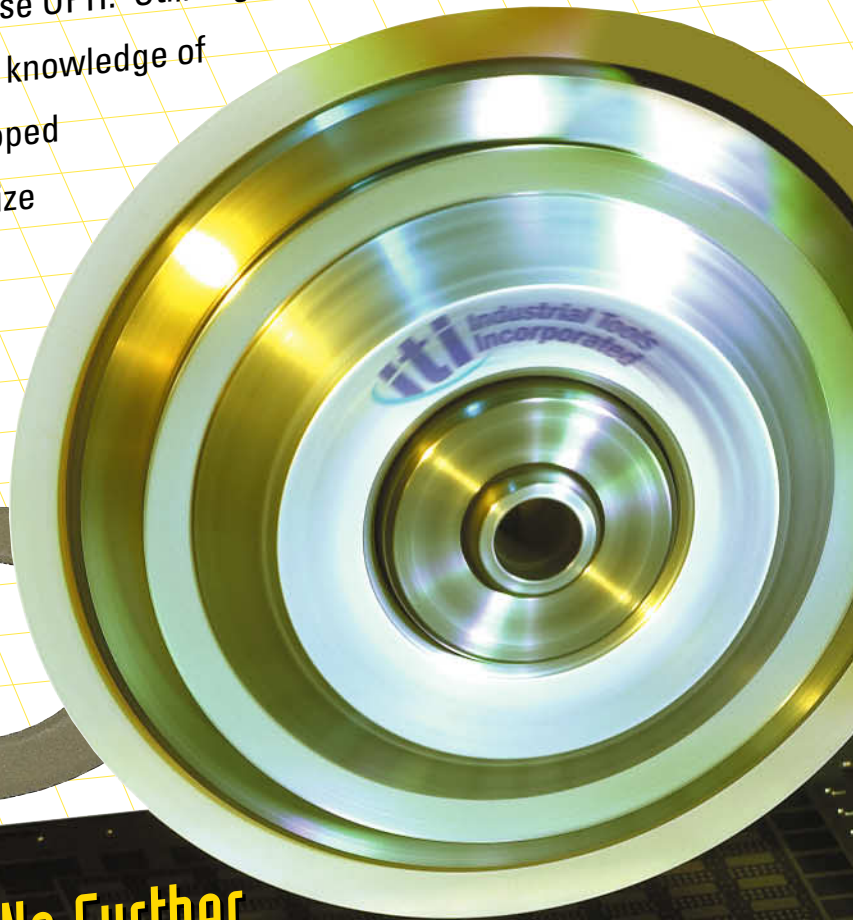
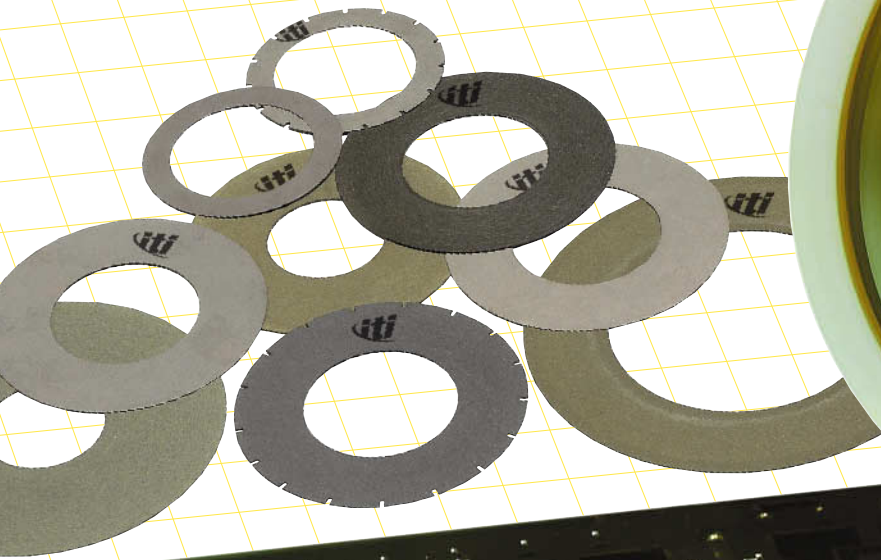


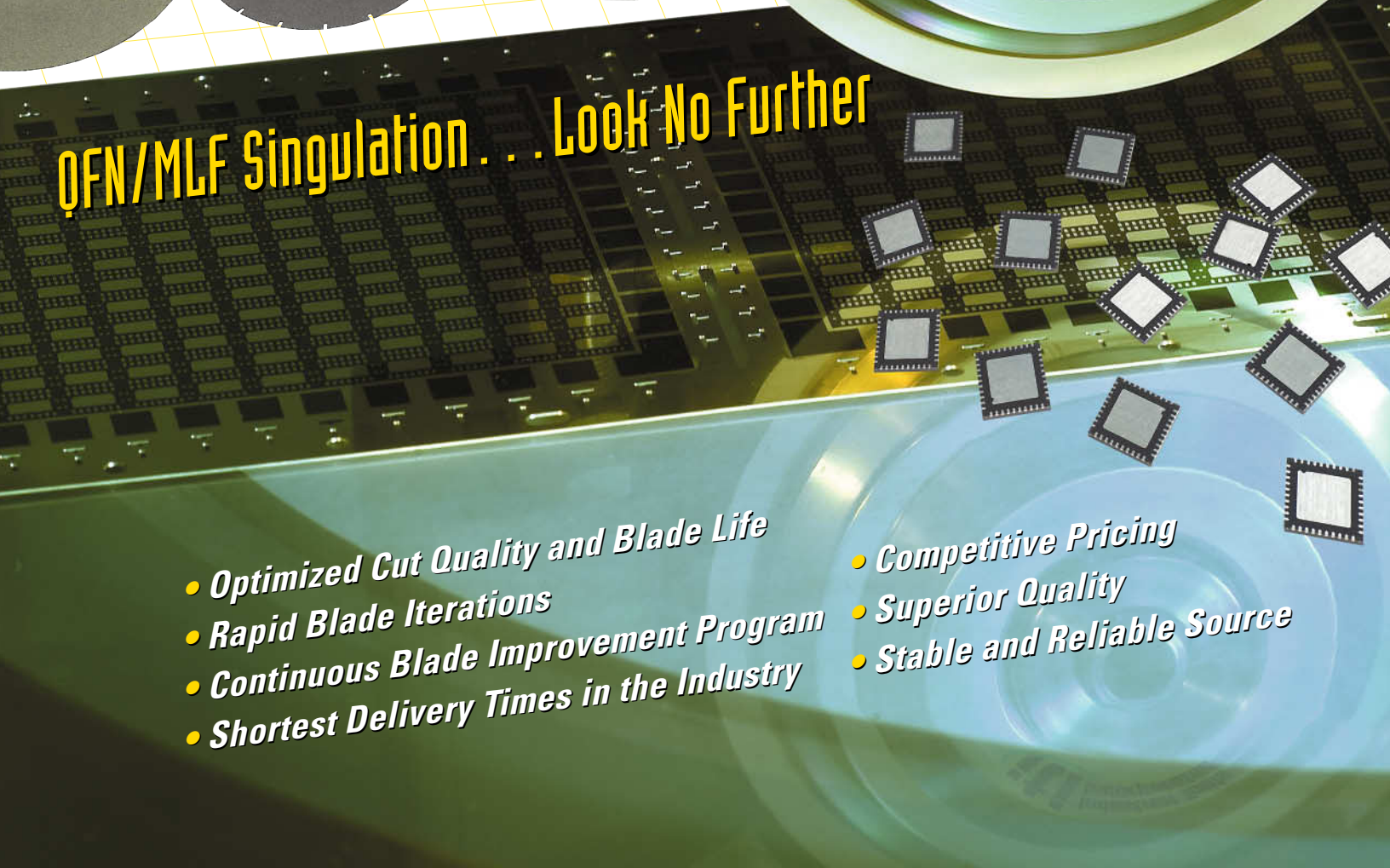


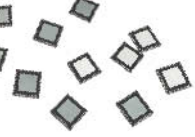
QFN/MLF singulation presents unique challenges such as burr, smear and the constant pressure to increase UPH. Utilizing our application engineering team with an extensive knowledge of QFN/MLF singulation, ITI has developed precision diamond blades to maximize blade life and performance.



## QFN/MLF Singulation . . . Look No Further

- *Optimized Cut Quality and Blade Life*
- *Rapid Blade Iterations*
- *Continuous Blade Improvement Program*
- *Shortest Delivery Times in the Industry*
- *Competitive Pricing*
- *Superior Quality*
- *Stable and Reliable Source*





The singulation process inherently creates a series of problems with QFN/MLF substrates. The copper material is soft and ductile whereas the mold compound is brittle. The combination of these two materials creates the challenges in singulation.

ITI has developed both resin and metal bond blade formulations to considerably improve the overall singulation process. The new blades involve the use of surfactants with chilled coolant in the dicing process at optimized parameters. Our new blade matrix significantly reduces blade wear while minimizing copper burr and lead smear as shown in the graphs. Although resin blades are primarily used to dice QFN/MLF product, metal sintered blades have shown promising results and could be the trend for dicing QFN products in the future.

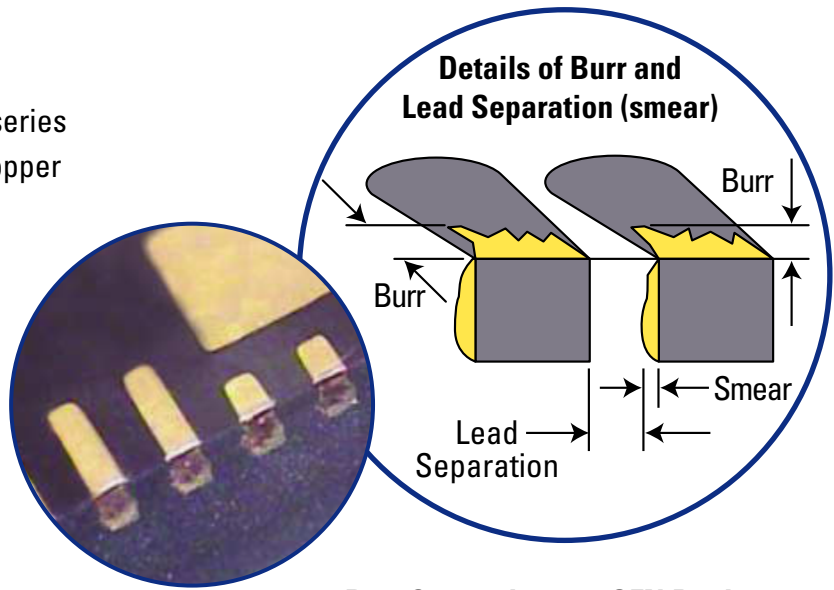
ITI's wide range of custom blade formulations provides you with the lowest "cost of ownership". We can provide on-site process development and sample blades to solve your QFN/MLF singulation requirements. Let ITI be your partner in meeting your QFN/MLF challenges.

Contact the technical application specialists at ITI to discuss your cut objectives and challenges.

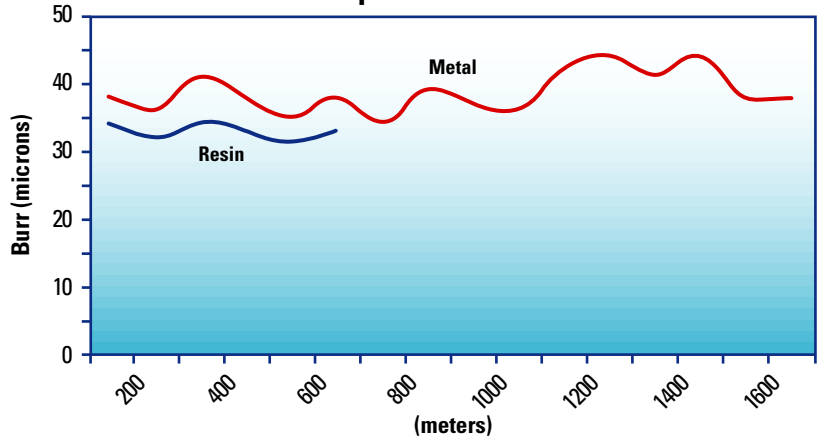


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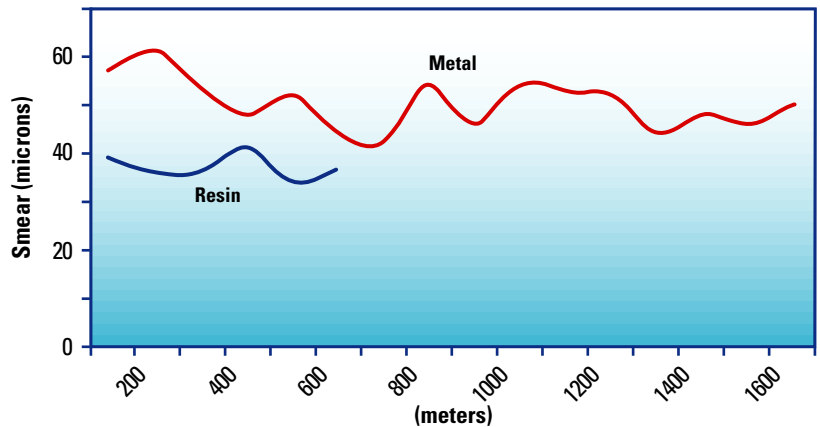
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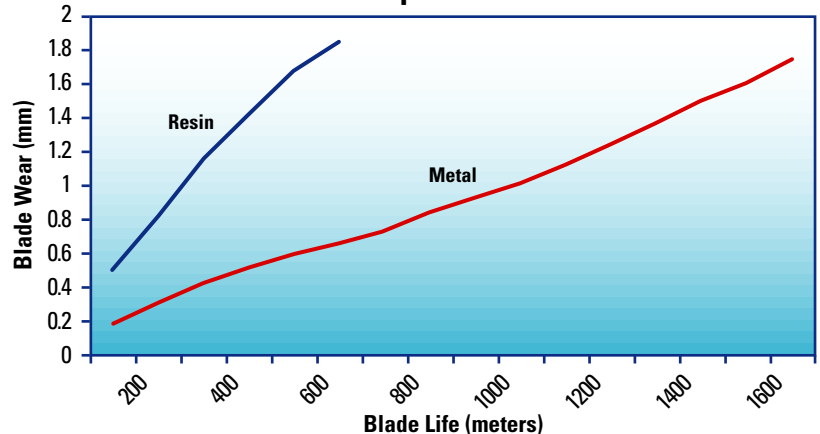
**Burr Comparison on QFN Product**



**Smearing Comparison on QFN Product**



**Wear Rate Comparison on QFN Product**



\*Results may vary based on leadframe design and process parameters.