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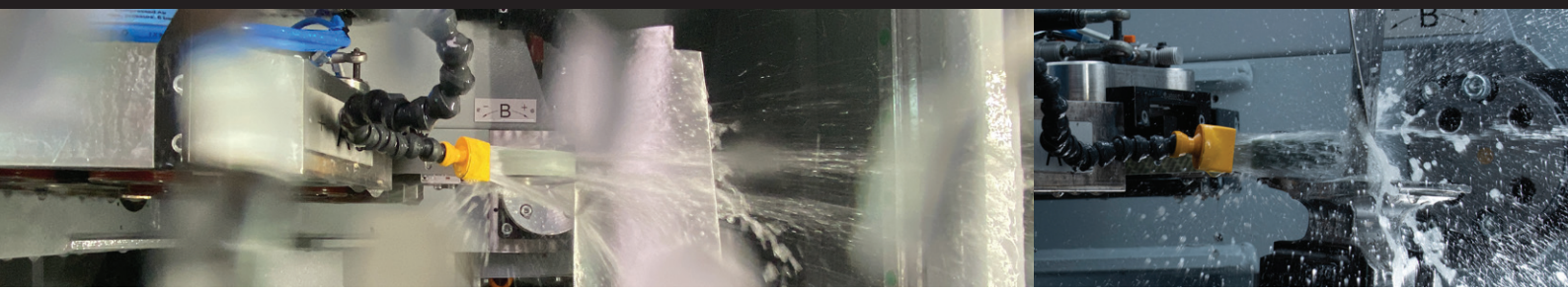
3M Abrasives
Success Story



Efficiency Boost with 3M™ Trizact™ in High-Precision Turbine Blades Grinding

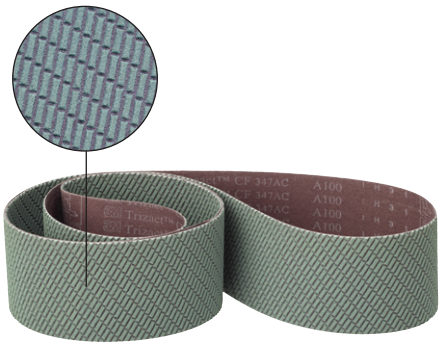
How 3M™ Trizact™ belts improve turbine blade manufacturing

About the Customer
GE Vernova, a global manufacturer of turbine components, operates a key service and repair site in Karlovac, Croatia. Responsible for servicing gas and steam turbine blades, the team previously relied on manual polishing processes to refine the airfoil surfaces after milling.

With increasing demands on turbine blade production efficiency and surface quality, the facility has invested in equipment from IMM Maschinenbau GmbH – a German machine building company with focuses on the design and manufacture belt grinding machines.

Customer Challenge
Manual polishing of turbine blades is highly dependent on operator skills and can lead to inconsistent results. More than 50 % of blades required post-process rework, adding time, cost, and potential risk to critical engine components.

Problem Solved
IMM delivered its SPE Machine grinding system, designed specifically for airfoil surface finishing. The machine combines six programmable CNC axes with a floating seventh axis for active pressure control during polishing.



Crucial to the process success were 3M™ Trizact™ Cloth Belts, specifically the 347FC and 253FA variants. These belts feature a micro-replicated, structured abrasive surface that maintains its sharpness over time and provides a uniform removal rate throughout the life of the belt. Durability under wet conditions, stable backing, and multi-layered abrasive structure made them the clear winner in extensive comparative testing.

“The combination of consistent abrasive properties, wet-process compatibility, and long lifespan makes 3M Trizact™ the first choice for automated grinding,” explained Nikolas Lehrke, Managing Director of IMM Maschinenbau GmbH.

“We tested several other suppliers over the past few months, but in terms of belt lifetime and surface uniformity, 3M Trizact™ Cloth Belts delivered the best results,” said Marko Musulin, Production Manager at GE Vernova.

2X Higher Throughput

100% Specification First Time

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Results and Benefits

2x Higher Throughput
The polishing process now enables the GE Vernova team to process twice as many blades in the same time compared to manual methods. “When we consider the time saved on rework and measurement, our overall output has doubled,” explained Musulin.

Zero Rework – 100 % Specification
The CNC-driven belt grinding process yields parts that consistently meet surface requirements. Previously, up to 50 % of manually polished blades required additional work. Now, no rework is needed.

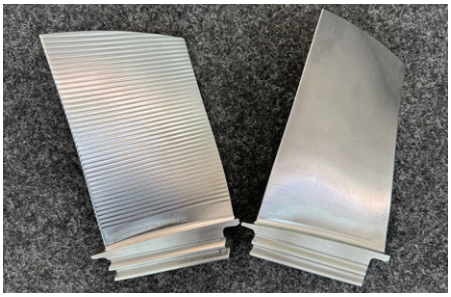
Enhanced Safety and Working Conditions
The system’s wet operation eliminates dust and significantly reduces vibration and noise. As Nikolas Lehrke from IMM notes: “Compared to manual polishing, it’s a huge step in health and safety. The entire machine is enclosed and coolant-controlled – no overheating, and no operator exposure to airborne particles.”

Compact, Efficient Design
The machine integrates all controls, cooling, and filtration systems into a single compact unit. Only the coolant filter system is separated, making installation easy and minimizing factory space requirements. “With one 3M™ Trizact™ belt, we can remove material and achieve the desired surface finish in one step.” – Internal project feedback, IMM Maschinenbau GmbH & GE Vernova.

Process Insights

According to GE Vernova, depending on the blade geometry and material, the belts show impressive longevity:

- For smaller blades (~200 mm), one 3M™ Trizact™ belt can polish up to 5 parts.
- For large, rougher austenitic blades, one belt may be used per part, still offering better performance than other abrasive belts tested.



Before and after processing using one belt step.

Solution Spotlight

3M™ Trizact™ Cloth Belts – Engineered for Precision Processes

- **Long Product Life**
  These belts feature a micro-replicated, 3D abrasive structure that exposes fresh mineral over the life of the belt.
- **Fewer Belt Changes**
  High durability and consistent wear make these belts ideal for repeatable CNC operations.
- **Stable in Wet Environments**
  Unlike some other belt types, 3M™ Trizact™ maintains shape and performance when exposed to coolant.
- **Consistent Finish Quality**
  Delivers reliable surface results across multiple turbine blades with no drop in performance.

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