



The ISF[®] Process

Surface Engineering Designed for the Automotive and Trucking Industry



How does REM's Isotropic Superfinish Process Benefit the Automotive Industry?

REM's isotropic superfinishing technologies (the ISF[®] and Rapid ISF[®] Processes) are surface finishing processes that gently remove the surface asperities from metal components which are created during the machining and forming processes. This surface refinement results in a highly planarized, micro-textured surface that is optimal for lubricant retention and increases lambda ratio.

By reducing the friction, increasing the load distribution, and optimizing the surface texture, the ISF[®] Surface has been shown to increase efficiency, load carrying capacity/power density, and resistance to contact fatigue while also significantly reducing lubricant operating temperature and structure borne noise. The process has been proven on hypoid gears, fine-pitch transmission gears, double helical gears, etc. It is machine controlled, robust and maintains component geometry.

Before the ISF[®] Process



After the ISF[®] Process

Potential ISF Technology Applications:

- Axle gears
- Trunnions
- Transmission components
- Bearings
- Camshafts
- Crankshafts
- Rocker arms
- Tappets

ISF Automotive Part Performance Benefits:

- Increase fuel efficiency
- Increase load carrying capacity/power density
- Increase surface durability
- Reduce operating temperatures
- Reduce structure-borne noise
- Eliminate component break-in



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How does REM's Rapid ISF Process Meet the Industry's High Production Needs?

The need for REM's ISF Process in the automotive and trucking industries has never been greater. Consumers and governments are demanding increased fuel efficiency and reduced greenhouse gas emissions. Improved component and power transfer system performance are key value-added benefits for both customers and suppliers.

The batch-style ISF Process and its resultant ISF Surface offer performance benefits not seen by any other single technology. It is well suited to applications where bulk components or long shaft-like components need to be processed. The near single piece flow Rapid ISF® Process offers all of the benefits of the ISF Process but in a just-in-time production application. It is well suited to all varieties of gears that demand short processing cycle times and has all of the benefits of the ISF Surface. The Rapid ISF Process is well suited to integration in to a fully automated, partially automated, or manual manufacturing operation.



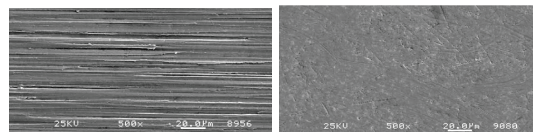
The ISF Process will produce a surface finish of Ra 2 - 10 µin (0.05 - 0.25 µm) in approximately 1- 2 hours depending on starting condition and final requirements. The Rapid ISF Process will produce the same finish levels in approximately 4-8 minutes. Both processes are capable of producing lower surface roughness finishes if required.

The ISF & Rapid ISF Processes produce better fuel economy, lower emissions, and increased component longevity.

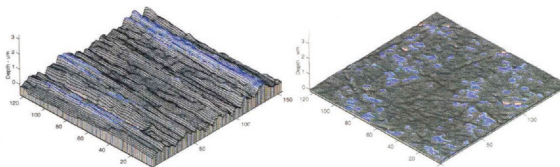
Isotropic Superfinish (ISF®)



Before the ISF® Process



Before and After scanning electron microscope images



Honed Surface

ISF Surface



After the ISF® Process



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