114 Infield Court | Mooresville, NC 28117
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REM'S ISF® (Isotropic Superfinish) Process

GearFX Driveline is proud to be an Authorized REM Facility. Since 2007, our expertly-trained staff have utilized state-of-the-art REM equipment to deliver the industries best polishing services.

The REM'S ISF® Process is a cost-effective alternative to an engineered machined surface in many applications where surface finish, increased wear, and friction reduction are important considerations. The REM'S ISF Process is an isotropic surface finishing process that produces a non-linear, low R_a finish that improves wear properties and reduces friction. It is a chemical mechanical process that sequentially removes the "peaks" of a ground, cut or honed finish while leaving the "valleys" unaffected. The end result is a dramatically improved surface finish with little dimensional change of the part.

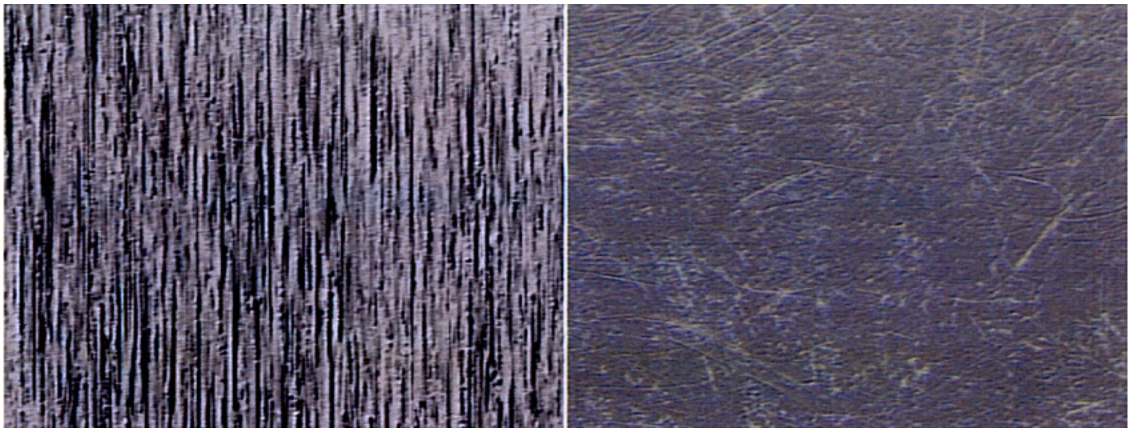
Two Step Process Description:

The first is the refinement process, where a chemical interaction takes place on the surface of the part. A thin (1 micron) film is formed on the surface that is soft by nature. Through the interaction of the media in a vibratory environment, this "film" is physically removed from the "peaks" of the processed part and the "valleys" are unaffected. The chemically induced "film" re-forms at only those surfaces interacting with the vibratory media and the process repeats itself. Over time, the "peaks" are removed, leaving only the valleys, producing the improved micro finish.

The second step we refer to is the burnish process. After the required micro finish is achieved, a mild alkaline mixture is introduced. After a relatively short period, a polished, chrome-like finish is produced. In addition to the polishing effects, this step effectively removes all traces of the film formation from the cut process. Cost savings are realized through the ability to mass process parts, allowing for a superior surface finish at less cost compared to conventional machining/grinding operations.

Microscopic Examination of a REM'S ISF® processed ground finish

Surface measurements supplied by a Hommel T1000 C



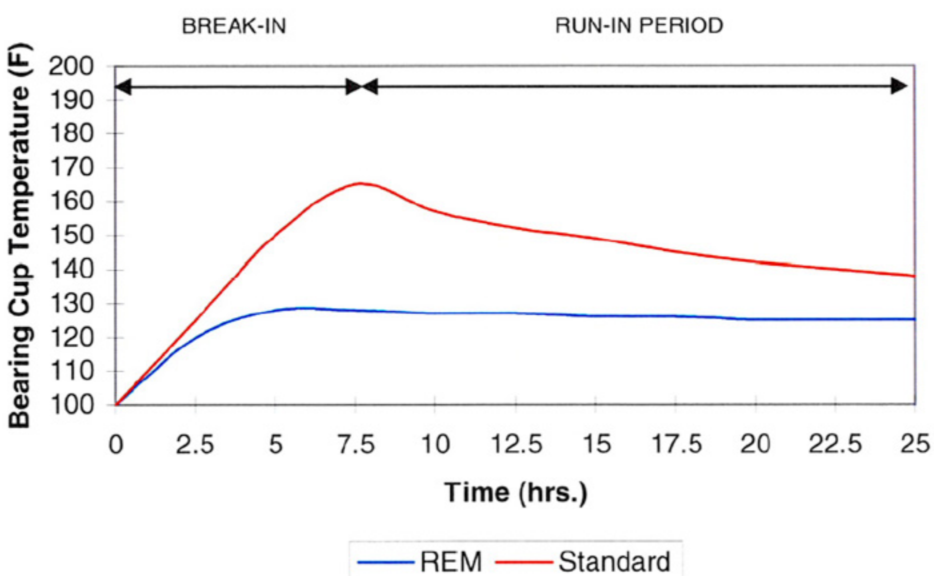
R_a: 15.4 R_z: 243.7 R_m: 309.4 ***R_a: 1.3 R_z: 7.08 R_m: 13.53***

The above photos detail the difference between a conventionally ground surface and an isotropic, non-linear processed surface.

Friction Reduction:

The reduction in surface friction properties is demonstrated below. An isotropic surface dramatically reduces the turbulence of the oil flow in a bearing when the lubricated surfaces are under load. This results in reduced oil temperatures within an assembly. The stable bearing cup temperature of the isotropic bearing cup reveals that this surface requires no run-in time and generates less heat than a conventional ground surface.

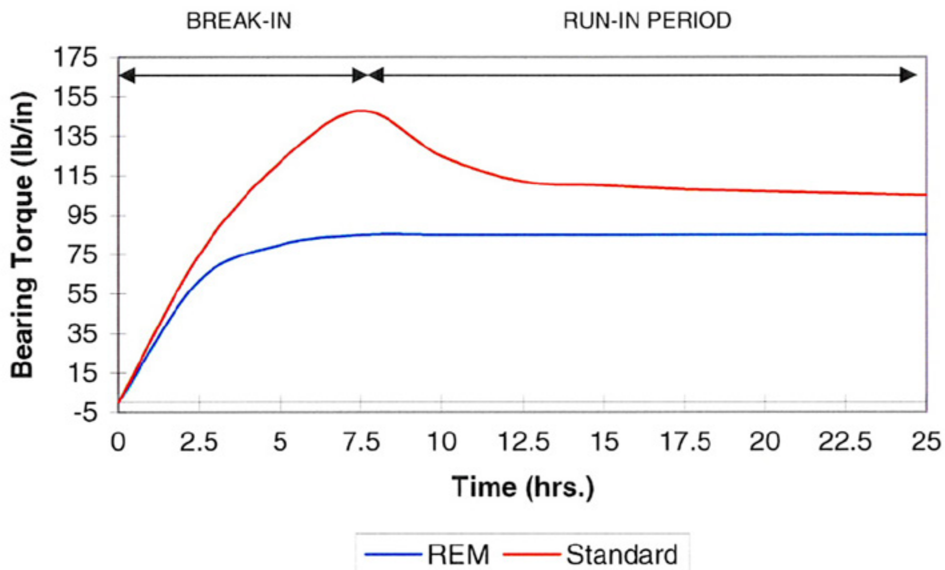
Temperature comparison between a conventionally ground and isotropic bearing assembly.



Friction Reduction (cont.):

An analysis of the reduction in surface friction properties are demonstrated by the decreased torque values of the isotropic finished bearing. The stable load values of the REM'S ISF® processed bearing during loading and run-in reveal a considerable reduction in surface friction properties and a reduction in horsepower loss achievable within assemblies.

Operating torque comparison between a conventionally ground and isotropic bearing assembly.



Dimensional Changes:

The amount of size change is dictated by two variables. One is the beginning surface finish, and two, is the desired ending R_a value. In most applications where starting microfinishes are between 15 and 30 R_a, actual dimensional change is negligible. More pronounced size change is realized when relatively rough surfaces are reduced to low R_a values. The chart below details changes in R_a values and material removal rates in relation to process time. The ability to reduce a 60 R_a surface to 14 in one hour demonstrates ability to achieve dramatic improvements in surface finish on a cost-effective, mass produced basis.

Relationship between process time and material removal:

Sample	Time (Hours)	Starting Finish	Final Finish	Starting Weight	Final Weight	Weight Loss	% Weight Loss
1	1	60	14	67.9687	67.8545	0.1143	0.16
2	2	59	8	67.1723	66.9696	0.2021	0.32
3	3	63	6.5	61.6750	61.4100	0.2650	0.43
4	4	61	6	68.5489	68.1914	0.3575	0.52
5	5	62	5	65.9300	65.5157	0.4143	0.63
6	6	65	5	62.7378	62.2584	0.4794	0.76

Benefits:

- A cost-effective alternative to conventional machining and grinding processes.
- Low R_a surfaces can be achieved on a mass produced basis.
- Significantly reduces surface friction properties.
- Reduces wear on metal-to-metal contact surfaces.
- Reduces lubricant temperatures.
- Reduces vibration and noise.

Applicable Materials:

- Carbon, Alloy and Tool Steels
- Stainless Steels (300 and 400 Series)
- Inconel and other Aerospace Alloys
- Titanium

Products Processed:

Machine Tool: Gears, bearings, shafts, bushings, spindles and slides.

Screw-machine and cold headed parts: Any parts where a low R_a finish is required on a mass produced basis.

Automotive, Racing and Marine: Gears, shafts, valve springs, crankshafts, camshafts and rocker arms.

A cost-effective alternative to traditional machining operations that adds value and improved performance to your production needs.

Call today for technical data and application information.

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