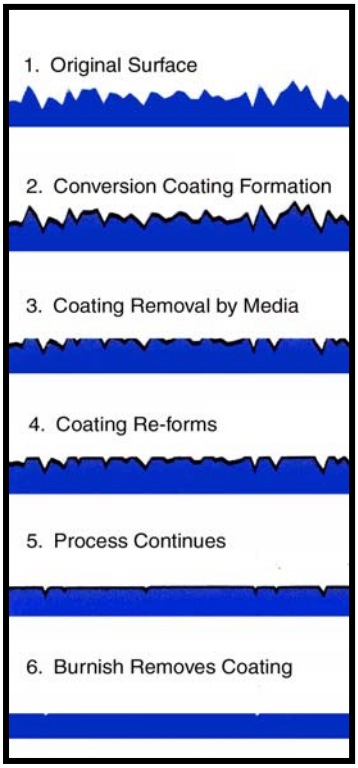
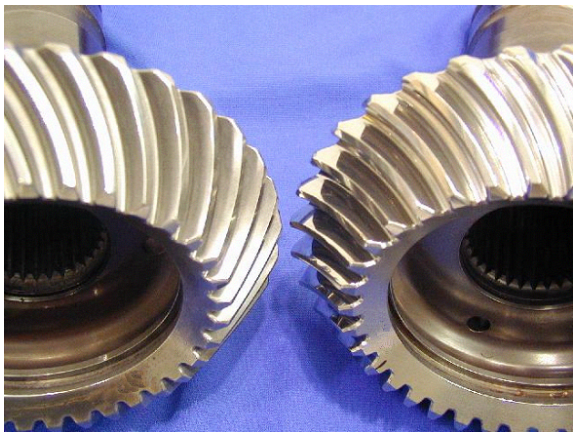
AMMTIAC Employs "Superfinishing" Process to Extend Weapons Systems' Service Life

AMMTIAC is using a novel material processing technology to enhance the surface finish of metals and improve their durability against frictional forces. This process, called Superfinishing, removes the surface roughness of metallic components, while maintaining their original dimensions and geometric design tolerances. While this process has been shown to be effective for improving the performance and increasing the life of gears and bearings, it is also being developed for use on other friction-susceptible systems.

Many metallic components are manufactured to their rough dimensions through a combination of metallurgical-processing techniques. The components are then machined to obtain the required final tolerances. However, machining processes used to finish metallic components leave microscopic surface features that can influence service life, if the component in question experiences movement and interaction with other components, such as the mating of gears. Therefore, additional processes are needed to eliminate these features while preserving the required geometric accuracy.



Superfinishing employs vibratory polishing techniques that expose the metal surface to ceramic particles dispersed in a corrosive liquid reagent that chemically converts the surface being polished. The corrosive liquid oxidizes the component surface which is subsequently abraded by the ceramic particles suspended in the vibrating fluid. The process repeats until the surface is extremely smooth. This process is beneficial to applications that are subjected to high degrees of wear from contact with other moving components.



The benefits of the Superfinish process will translate into improved system durability for both existing and new designs.

AMMTIAC is developing the Superfinishing process to improve the wear resistance and overall performance of components, and thereby extending the lives of metallic components. For power transfer components, such as gears, improved surface finish can reduce pitting fatigue, enhance bending fatigue durability, and result in a reduction of frictional losses.