

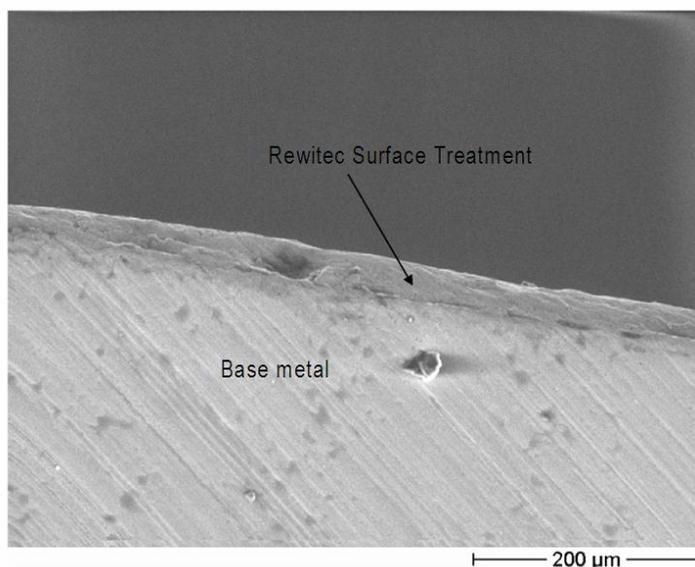
Rewitec: How it works

REWITEC is a surface-modifying treatment that is added to the lubricant in the machine, which carries the compound to the friction zones of metal surfaces. The process develops when the machine is in full operation without losing productive time. It was not conceived for improving the lubricant but instead for reconditioning the metal structure. Rewitec is an innovative process which substantially alters the structure and metallurgy of a machine component under friction. It is used in engines, gears, compressors, bearings, and many other applications protecting machinery and machine elements in a wide range of industries. The process improves a range of surface related properties including: resistance to wear, to abrasion and to oxidation, wetability, adhesion, and fatigue. Mechanical parts acquire a new, smooth metal silicate surface with improved frictional quality.

The active components of REWITEC consist of a mixture of various synthetic silicates. Load, speed, temperature, and pressures in the frictional contact cause the treatment components to bond with the metal surfaces, incorporating silicon-containing groups into the sub-surface layer (i.e. 5 to 30 μm in depth) of the metal structure. Such silicon surface modification produces the unique properties of a uniformly graded layer, not a coating. Unlike a coating, the graded layer lacks an abrupt transition boundary and thereby resists cracking and spalling caused by thermal stress, physical stress, and corrosion. Under certain circumstances, the modified surface structure also has a unique self-healing capability, filling in roughness, pores and micro cracks in the metal and restoring the metal's frictional characteristics and improving its tribological properties.

The surface which once had metal-to-metal friction is modified now to have an extremely smooth and solid metal silicate layer with contact between two metal silicate surfaces with very low friction and high resistance to abrasive wear.

The Rewitec mechanical treatment is able to effectively modify a wide variety of metals and alloys used in engines and machines. These materials range from steel to bronze, to aluminum and Babbitt. A key advantage of the Rewitec process is that, unlike other surface treatments, only a thin layer near the surface is modified, resulting in little or no change to the bulk material properties of the metal surface.



Micro section of a treated metal surface:

This picture was taken with a REM microscope showing the surface section of a ball bearing race from a planetary gear set. The equipment was operating 250 hours on a range of fatigue load. The Rewitec Surface Treatment strengthens the metal in loaded areas diffusing a layer clearly visible in this image between 5 to around 30 μm .

Expected Results

- The surface geometry of worn metal parts is restored up to the original
- Metal surfaces are repaired and revitalized on-site in operation
- Costs of repairs, labor, maintenance, lubrication, and parts are minimized
- Friction, vibration, and noise (NVH) are extremely reduced
- The break-in process of new mechanical equipment is shortened
- Equipment efficiency is increased by around 10%; energy and fuel is saved
- Higher productivity is ensured; mechanical related downtime is avoided
- Emergency runs without oil are possible
- In engines, oil consumption is reduced. carbon build up is avoided
- Contributes to protecting the environment by reducing greenhouse gases and emissions (CO₂, HC and NO_x) and by lowering consumption of resources like fuels, oil, and grease.

Technical Characteristics

- Rewitec Nanocoating has a very low coefficient of friction between 0.03 and 0.07
- It resists high temperatures up to about 3000 °F
- It has a linear thermal expansion coefficient similar to steel: $\alpha=13.6 - 14.2$ ppm/K
- Rewitec Nanocoating improves micro-hardness of the surface by about 30%
- It has a high pressure resistance (Hertz pressure) of more than 2500N/mm²
- The coating process is intrinsically controlled
- Rewitec Nanocoating prevents hydrogen cracks.