Metal Surface Treatment

WPC treatment, developed and refined for the motor industry, will accelerate your success.

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Metal Surface Treatment

WPC

Wonder Process Craft

WPC is a proven treatment process that has been used for many years in Japan whereby ultra fine particles of various media are fired at high velocity towards the surface of a product.

The thermal discharge that takes place upon impact permanently changes the product surface, strengthens the ionic structure of the metal by compaction and creates a harder, more durable final product.

Creating an unrivaled finish

For Motor Sports

Key Advantages

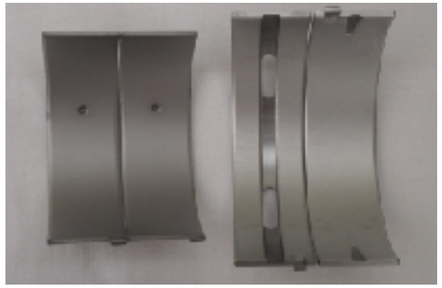
1) Reduced friction on all sliding structures
Pistons, cam rods and crank shafts that require smooth movement for instant engine response.

2) Improved durability
Connecting rods, gear teeth and springs which are susceptible to breakages.

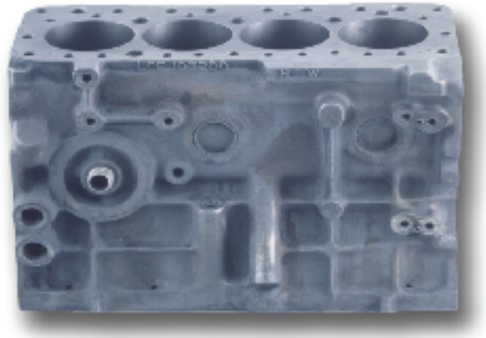
3) Protection against metal seizures
Bearings, piston pins, etc. that are subjected to high pressures.

Reduced Friction due to WPC

Pistons



Bearings

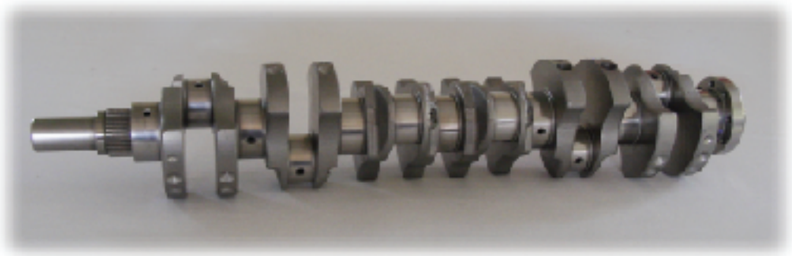


Cylinder blocks

Cam rods

Piston pins

Crank shafts



WPC succeeds in reducing the friction that all these items are subjected to by creating a unique micro-dimple surface pattern.
The three major benefits are:
1) Overall reduction in friction that leads to a smoother, more instantaneous response.
2) Oil can be run for longer periods of time at optimum temperatures.
3) The possibility of seizures is reduced as a direct result of the former two.

The fine grooves that are intrinsically engraved into the product surface at the time of machining are transformed into micro-dimple indentations by the impact of the ultra-fine media during WPC treatment and these dimples then act as oil reservoirs.
Thus, oil that would normally drain away through the grooves in an untreated product when pressure is applied is instead retained in the dimples of a WPC treated product helping to keep the surface lubricated.
Furthermore, solid lubricants such as Molybdenum Disulfide (MoS2) and/or Tin (Sn) can be utilized as media in the WPC process to embed them into the product surface, reducing friction and improving the life and efficiency of the product to an even greater level.

3D images of surface roughness

Pre-treatment | Post-treatment

Greater Durability due to WPC

Gears

Connecting rods

Valve springs

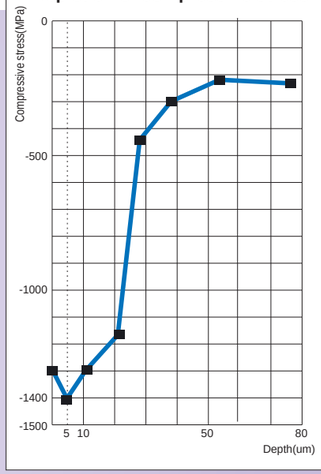
Drive shafts

Exhaust manifolds
to prevent cracking by the weld zone

Parts such as these are subject to cyclic stress which often leads to surface fatigue failure.
The WPC process changes and enhances the surface condition so that it exhibits better strength properties.
The final surface is much more resilient to cyclic stresses compared with other untreated or conventionally treated surfaces.

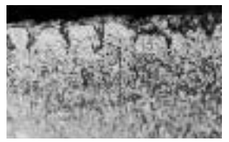
The ultra-fine media of the WPC process when projected at high velocity towards the product surface create compressive stress at the impact points.
At the same time a micro thermal reaction takes place that effectively seals minor surface fractures and allows a condensed surface to form with improved density due to compaction.
This altered and highly compact surface condition overcomes the problem of brittleness that is usually encountered when metals are hardened.
The impacts during the WPC process not only increase the residual compressive stress but also cause it to reside a lot closer to the surface.
The cumulative result is a product that has a durability unrivalled by conventional peening methods.

Depiction of compressive stress



Magnified cross section of gear surface compaction density

Pre-treatment



Post-treatment