



Wristpin Application Note

Issue Date: January 2008

Connecting Rod - Piston Pin – Piston Assembly

Figures 1 and 2 (see back) show an example of a Carbon Raptor® coated piston pin that saved an engine block in a blown alcohol drag racing application. The aluminum piston melted due to detonation, and aluminum melted onto the surface of the connecting rod and the inner diameter of the piston pin. The pin did not freeze up in the piston or in the connecting rod, which allowed the piston assembly to continue to rotate and the engine to be shut down prior to the connecting rod breaking and being thrown through the block wall.

The piston, piston pin, connecting rod and cylinder liner were a total loss. The block was intact and run for the rest of the season.

Aluminum from the piston melted into the inner diameter of the pin and onto the connecting rod. The outer diameter of the pin has no melted aluminum on it, and its surface looks as it did in original use. The edge of the pin is damaged where it ran against the cylinder liner until the engine could be turned off.

Carbon Raptor – Hard Carbon Coating



Figure 1. A Carbon Raptor coated piston pin that saved an engine block in a blown alcohol drag racing application. Parts courtesy of Quest Racing, Worcester, Massachusetts.



Figure 2. A close up of the piston pin in small end of a connecting rod. Parts courtesy of Quest Racing, Worcester, Massachusetts.

Unique Properties

A unique set of properties combines for this success:

High Hardness – Surface hardness is more than 35 percent greater than R_C 60 equivalent.

Low Friction – Testing demonstrated that Carbon Raptor® reduces friction by more than 70

percent when compared to uncoated, similar steel components.

High Adhesion and Flexibility – Chemical and physical bonding to the pin and thin film flexibility ensure that Carbon Raptor will not delaminate or flake.

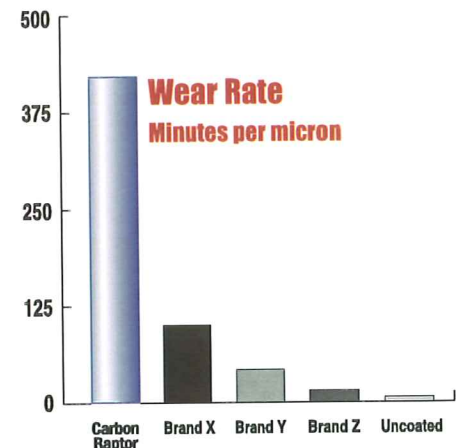
High Surface Conformance – Highly finished wrist pins retain their finish with Carbon Raptor,

with no post-processing steps. Surface measurements on a polished surface with an average roughness (R_a) of $0.5 \mu\text{in}$ (microinches) increased by only $0.05 \mu\text{in}$ after Carbon Raptor was applied.

Heat Transfer – Unlike other coatings, Carbon Raptor is a good thermal conductor.

Proven Experience

Join the racers and engine builders who have used tens of thousands of Carbon Raptor coated wrist pins and are pulling ahead of the competition!



Substrate: Hardened Steel – Sliding speed: 430 feet per minute. Wear Force: 50lb. Brass - Lubrication: None.

Carbon Raptor® – Successful on more than a dozen engine parts!

Demand Carbon Raptor for demanding applications!

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Figure 3. Anatech's state-of-the-art technology assures consistency and reliability.