IPD TECH BULLETIN

Breaking in rebuilt engines

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The parts manufacturer can provide great replacement parts and the technician can do an outstanding job of assembling the engine, but you can still have a problem with oil consumption if the engine is not broken in correctly to get the piston rings to seat.

Rings are designed to apply a certain amount of tangential force outward, but compression rings rely on the greater combustion pressure to force them down against the bottom of the piston's ring lands and outward to the cylinder wall. Without this combustion force, these rings will not seat or seal properly. Oil control rings regulate the amount of oil film left on the cylinder wall to lubricate the compression rings and in turn each compression ring removes some amount of this oil film resulting in proper oil control.

While it is best to break an engine in under a controlled environment, such as a dynamometer test, where load factors, horsepower, temperatures, etc… can be controlled and monitored, it's simply not always an option available after a repair or rebuild. That's not to say you cannot get piston rings to seat without such equipment, but it is important that an adequate load be put on the engine to create enough combustion pressure and temperatures to seat the rings. This is most critical within the first few hours of the engine's new service life. Idling, increasing the RPM, and hauling light loads will not create enough combustion pressure to seat new rings. Diesel engines operate best under load and by loading them the pressure and temperatures needed can be obtained.

We have not found an OE publication that formally details the process for breaking in an engine outside of a controlled environment to reference, but through our research have found that by keeping idle time to a minimum and operating a freshly rebuilt engine at 75% of full load for at least the first 3 to 4 hours produces satisfactory results in getting piston rings to seat.

The percentage of load and duration may change from rebuilder to rebuilder as many already have a proven process for engine break in, all agree that once the initial start up and checks are complete getting a load on the engine is vital to seating the rings. Delaying this loading process can result in prominent damage that will increase oil consumption.

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