

The concept

The Diesel Engine Soot Reducer by Michael J. Holihan/Patrick J. Derbin (U.S. Patent #8,955,474)

Electronically control the flow of oil to the diesel piston underside for the purpose of reducing soot in the crankcase and exhaust.

Preventing



NEW INSIGHTS

- Uses on-board ECM to pulse width modulate a solenoid valve to provide measured oil to cool the piston underside..
- Adapts to diesel engines equipped with oil cooling nozzles "Pee-Tubes" directed to the piston underside.
- Reduces particulate emissions and increases oil life.

<http://www.google.com/patents/US8955474>

Background:

- All diesel manufacturers design for max oil flow cooling to the piston(s) for worst case operating condition. This results in a piston temperature decrease to below it's critical operating temperature (at light loads), creating poor combustion.
- This non-optimal operating temperature creates a lower piston dome surface temperature, sometimes referred to as "super cooling". At these light load conditions, this poor combustion results in soot particles washing down to the oil sump and also out the exhaust.

Approach:

- On many diesel engines, oil is directed by a spray nozzle "Pee-Tube" which directs crankcase oil to the piston underside for the purpose of maintaining a safe operating temperature for the piston.
- The Holihan-Derbin invention electronically modulates a solenoid valve which delivers the cooling oil to the piston underside. A software table look-up is incorporated to dictate the optimal pulse width to allow improved combustion, hence reduced soot in the crankcase and output exhaust.



Results from EPA SBIR Final Report:

- https://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/10012/report/F
- Approximately 40% reduction of soot in oil sump.
- Approximately 40% reduction of hydrocarbon emissions @idle.
- Approximately 36% faster warm-up @idle.

Benefits

- Allows longer intervals between oil changes.
- Allows the reduction in size of the main oil pump, reducing a parasitic load.
- Allows the use of dual fuels, i.e., propane-diesel, or other alternative fuels.
- Allows for rapid warm up, especially in cold climates.
- Improved combustion efficiency during extended idling.

What diesels will this work on?

• The soot reducer will work on the majority of diesel engines, including military, marine, mining, construction, locomotives, gen sets, light/med/heavy duty diesel trucks, off road, automotive diesels.

Would like additional information?

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