

Optimizing Water Pump Life in Diesel Engines

Category: Coolants
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Introduction:

Engine manufacturers are renewing their position that their warranties cover faults in materials and workmanship, and may not pay warranty for failures resulting from poor maintenance practices or routine wear. Water pumps fall into this category of failures.

Terminology:

EG -- Ethylene glycol

PG -- Propylene glycol

RP -- A Recommended Practice of TMC

TDS -- Total Dissolved Solids

TMC -- The Maintenance Council of The American Trucking Association.

Penray's Recommendation:

Adequate investigation and published data exists to permit the conclusion that elevated phosphate, TDS and/or silicate levels can decrease water pump seal life. The documentation in this regard is more than adequate.

Automotive coolants and old-technology GM-6038 type heavy duty coolants are the worst offenders. These formulations contain high concentrations of phosphates to increase pH and RA (reserve alkalinity). Alternatives, best exemplified by advanced coolants that meet TMC RP-329 (EG) or TMC RP-330 (PG) have been developed. The new coolants employ lower concentrations of silicate and phosphate. In fact, antifreezes that use Penray technology are phosphate-free and generally contain less than 250 ppm of silicate. This technology has been used by major engine OEMs for their "house brand" antifreezes, including Caterpillar® and Detroit Diesel®. It is factory-fill in virtually all American truck and bus plants. An SAE paper reported data from a study of the technology which found that average water pump life exceeded one-half million miles in the fleet which was studied¹. In fact, the majority of the trucks were rotated with their original pumps.

Summary of Recommendations:

For best overall performance, use a coolant consisting of 50% fully-formulated phosphate-free, low-silicate antifreeze. Fully-formulated (RP-329 or RP-330) antifreeze should be used without the initial addition of any supplemental coolant additive (SCA).

For more detailed information on these antifreezes, refer to Technical Bulletins 01.007 and 97.006.

¹ Penray, R. P. and Eaton, E. R.; "Observations of the Reliability Effects of Operating Heavy Duty Diesel Engines with a Nitrite/Borate/Low Silicate Coolant with no Coolant Change Interval" SAE Technical Paper Series 960642, 1996, The Society of Automotive Engineers, Warrendale, PA USA