

Extended Service Engine Coolants

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Introduction:

Until a few years ago, it has been the recommended practice for heavy-duty fleets to purchase low-silicate ASTM D-4985 specification diesel engine antifreeze. This antifreeze, blended with water and supplemental coolant additives (SCA), was used to fill the cooling system. Periodic addition of SCA maintained cooling system protection. The coolant was changed about every 2 years or 200,000 miles. This practice, when followed, is effective in protecting engines and was required by all of the major diesel engine manufacturers.

Today, nitrite-containing antifreezes with additional carboxylic acid or phosphate-free, fully-formulated inorganic inhibitor technologies have been shown to provide greatly extended service in light duty engines and heavy-duty engines. The Penray Fill-For-Life® program uses American "fully formulated" specification coolant maintained by a patented membrane technology available only in Penray Need-Release® filters. The carboxylate alternative is known as "OAT" or "NOAT" (nitrited organic acid technology). The inorganic alternative is referred to as "Fill-For-Life".

OAT/NOAT vs. Fill-For-Life:

Side-by-side testing conducted by Penray and other companies has demonstrated that both technologies provide adequate corrosion protection for all the engines in which they were evaluated. It is important to note that some tests of non-nitrited carboxylic acid technology (OAT) coolants have produced failures of wet sleeve liners by cavitation-erosion. ASTM D 2809 tests of nitrited carboxylic acid coolant (NOAT) have resulted in catastrophic water pump failure. On the other hand, fully formulated coolants, optimized for extended service interval (ESI) service, have passed these evaluations with perfect or near perfect ratings.

Several evaluations of the two technologies compare their respective service lives. All have found them comparable. In fact, a Ford Motor Company® study concluded that carboxylic acid coolants "do not offer any significant advantages for the consumer...current coolant corrosion protection can be extended far beyond previous expectations". This study has not been refuted.

The literature records that carboxylic acid coolant performance may be seriously compromised if it is mixed with conventional antifreeze. OEMs recommend that OAT coolant, if contaminated with conventional coolant be removed and thrown away.

Fleet testing has provided an opportunity to measure the relative operating costs of the two alternative programs. The data suggests coolant loss from the test fleet, in spite of elaborate efforts to control leakage, exceeded expectations. The costs of operating test trucks on the NOAT inhibited coolant are significantly higher than the cost of the Fill-For-Life vehicles. The greatest part of the cost differential is contributed by the unexpected and uncontrollable loss of coolant, which is about the same in both sets of trucks. In addition, serious problems arising from the OAT/NOAT coolant entering the lubrication system have been reported. A further concern is a problem observed when certain automotive radiators manufactured by one advanced process are exposed to OAT coolants.

The Penray Alternative:

Fully formulated antifreezes include nitrite, providing superior engine protection. Penray versions are phosphate-free, giving the advantage of lower total dissolved solids, and improved water pump life. They are completely backward compatible with earlier antifreezes/coolants. These products are also recommended for use in all light, medium and heavy-duty vehicles, simplifying fleet maintenance procedures. Balancing corrosion inhibitors ensures excellent performance. Several brands of antifreezes have incorporated this technology. Extensive fleet documentation shows lower costs, longer service life, and superior compatibility makes Penray the most logical choice.