

Keep Cool With ELCs

Longer drain intervals and improved performance are just a few of the benefits of extended life coolants.

By G.C. Skipper, Contributing Editor

Despite the fact that extended life coolants (ELC) have been on the market since 1985—and offer an abundance of advantages for today's engines—they're still largely misunderstood by many fleet managers. In fact, ELC chemistry and less-structured cooling-system maintenance requirements are contributing to increased coolant problems when the exact opposite should be true.

"Maintenance technicians are used to just topping off coolant," says Elizabeth Nelson, coolant program manager for Polaris Laboratories. "Today, they really need to pay more attention to what they're doing."

When technicians mix different coolant formulations—something Nelson says they're seeing increasingly more of in the samples they test—they're asking for trouble. For example, when you mix conventional coolants with organic acid technology—a basic part of ELC—chemical reactions can affect the inhibitor package.

"An ELC formulation is different from conventional coolant," says

Nelson. "Carboxylic acids in ELC are designed to keep the metal clean. Clean metal gives you better heat transfer. If you mix ELC with more than 20 percent of another type of coolant, you dilute the carboxylic acid and it can't provide the protection it should. That can result in corrosion and pitting."

In addition, if ELC is topped off with conventional coolant, it knocks the silicates out of solution, which can plug the cooling system passages. If passages are dammed up, the coolant starts to break down and form degradation acids.

"You can mix them," says Richard Gapinski, driveline and



When using extended life coolant, it is critical that you top off the coolant level, as shown here, with the proper ELC coolant additive. OEMs do not recommend mixing ELC with conventional coolants. Photo courtesy of Shell Rotella

ancillary technical manager for Castrol Heavy Duty Lubricants. “But we don’t recommend it. When you mix the different lubricants, you’re diluting some of the advantages of ELC.”

Steve Overdeck, vice president of sales and operation for Kost USA, says 40 percent to 60 percent of engine failures are coolant-related.

“What that means is maintenance technicians are using an improper coolant or topping coolant off with the wrong coolant,” he says. “It can also happen if they’re not using proper maintenance.”

Improper water use can also lead to failure, says Overdeck. Deionized water contains no hardness to scale inside the engine where hot spots occur.

A better coolant

ELC was developed to meet customer demands for extended drain intervals.

“Users were looking for a way to eliminate the old problem of silicate reacting with metals to precipitate out sediment” says Gapinski. “That prompted the development of organic acid coolant.”

Development was also driven by OEMs needs for a coolant that would handle higher engine temperatures.

“Manufacturers wanted a nitrite-free formulation,” says Overdeck. “Nitrite in conventional coolants is used to protect liners against pitting. Diesel-powered engines have piston sleeves that are cooled and protected by the coolant that surrounds the casings. The coolant forms a ‘sacrificial’ coating on the outside of the piston liners. As pistons churn up and down, they vibrate. The vibration forms bubbles and air pockets



Laboratory equipment, such as this at Polaris Laboratories, is used to test for conductivity and total dissolved solids (TDS) in coolant samples.

that collapse against the cylinder liner at very high psi. The coating created by nitrite deflects that bubble attack from the liners.”

The advantages to ELC are many. Basically, it helps construction equipment fleets perform better and reduces downtime, says Carmen Ulabarro, market development specialist at Chevron Global Products. It:

- Lasts longer
- Reduces cooling system maintenance costs
- Improves heat transfer
- Improves water pump life
- Offers complete protection for all cooling system components, including aluminum.

Extended drain intervals are actually built in to ELC’s chemistry.

“ELC coats only those areas in the engine that are hot spots,” says Overdeck. “Conventional coolants basically coat everything they come into contact with. That’s why ELC lasts longer. When conventional coolants coat everything, they create a wall that doesn’t allow cooling to be as efficient.”

And there’s another advantage to ELC: According to the experts, ELC is more environmentally friendly than conventional coolants. If ELC should leak into the environment or if it isn’t disposed of properly, the carboxylic acid will biodegrade.

“Goof-proof” maintenance

The only disadvantages to ELC are based on the fact that end users don’t know how to maintain it.

“Any fleet can use and benefit from ELC,” says Nelson. “Just put it in the engine and let it run over an extended period of time without adding other chemicals.”

While it’s not required, Dan Arcy, technical marketing manager at Shell Lubricants, recommends sampling coolant regularly.

“Take a sample of coolant every month when you service diesel-powered vehicles and check the sample for clarity,” he says. “Put it in a clear jar and hold it up to the light. If the coolant is clear and bright, you’re okay. There shouldn’t be any particles floating in it.”

Arcy also suggests checking the

freeze point of ELC. A 50-50 mixture has a freeze point of minus-34 degrees Fahrenheit.

“That’s all you need to do to maintain ELC,” he says.

Although Gapinski agrees ELC is almost “goof-proof,” he says extender must be added as recommended by the manufacturer.

“ELC shouldn’t be allowed to run beyond the maximum—600,000 miles or 12,000 hours on-road and 300,000 to 400,000 miles or 6,000 hours off-road—without adding an extender,” he says. “Extenders are readily available from any ELC marketer; but be sure to use the same brand of extender as the coolant.”

Some engines have actually been designed specifically for ELC: Never use conventional

coolant in those engines.

“When we look at engines manufactured overseas, we find different alloys in the metal,” says Nelson. “You might have a magnesium alloy, which could lead to trouble if you’re using a conventional coolant. The pH level of a conventional coolant is too high.”

According to Nelson, one major manufacturer’s engines require adding “a little silicate.”

“It’s not a big deal; just buy the abstract from the OEM and add it,” she says. “If fleet managers follow OEM specifications, they’ll be fine. They need to know what coolant is in the engine when equipment is delivered, what they have stored on-site, and what the OEM recommends to properly maintain the equipment.”

Turning up the heat

Compliance with ever-stricter emissions regulations is driving engine temperatures up and ELC can take the heat.

“Because of tougher emissions standards, engines, especially on-road engines, run hotter,” says Overdeck. “They dump all kinds of emissions back into the crankcase and that makes the engines work harder. When they work harder, they run hotter. With ELC, cooling efficiency is much better.”

Based on present indicators, by 2010, the heat in off-road engines will increase.

“Today’s engines have a 14- to 16-pound pressure cap,” says Nelson. “At sea level, the boiling point for water is 212 degrees F

Coolant Gallery



◀ Defendal

Both conventional and extended life coolants, under the Defendal brand, are available from Kost USA. High-performance ethylene glycol- and propylene glycol-based coolant/antifreeze products can be used in automotive, commercial, marine, and industrial applications. According to Kost, the company’s ethylene-glycol products deter consumption of antifreeze. Each product is precisely formulated using field-tested and OEM-approved additives to provide cooling and corrosion protection, and to extend component life.

For more information, visit: www.kostusa.com

Delo ELC-NF ▶

Chevron’s nitrite-free Delo Extended Life Coolant/Antifreeze (DELO ELC-NF) can be used for both on- and off-road vehicles, requiring a nitrite-free OAT formulation. The extended life coolant is capable of lasting to 600,000 miles or 12,000 hours with no chemical extender needed, according to Chevron. It provides corrosion protection; low electrical conductivity; protection against pitting, corrosion and erosion; and improved water pump life. Chevron also offers the product under its Texaco brand.

For more information, visit www.deloperformance.com



▶ Rotella ELC

Rotella Extended Life Coolant/Antifreeze from Shell is an ethylene glycol-based coolant for heavy-duty diesel, gasoline and natural gas-powered engines that protects all cooling system components. Field-tested in fleets for more than 100 million miles, the ELC is designed to be used 600,000 miles on-road or 12,000 hours off-road with a single ELC extender added at 300,000 miles or 6,000 hours.

For more information, visit www.shellserver.com/products/

