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Hot news about coolant hose failure

When Gates Rubber Company engineers reformulated their Green Stripe® hose for fleet and heavy-duty coolant systems, the result was a whole new generation of rubber hose with many performance characteristics of silicone hose, but at a fraction of the cost.

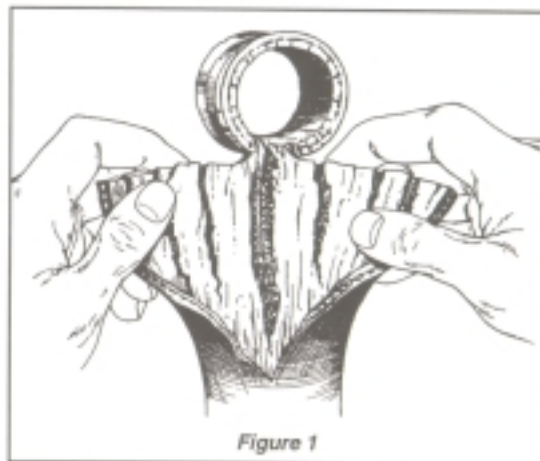


Figure 1

The enemy within

What you can't see can hurt you. That's what Gates engineers discovered during four years of field testing on fleet vehicles. In these tests they identified the primary cause of coolant hose failure as an electrochemical attack on the rubber tube compound in the hose.

This phenomenon is known as electrochemical degradation, or ECD. It occurs because the hose, liquid coolant (ethylene glycol antifreeze and water), and the engine/radiator fittings form a galvanic cell or "battery."

This chemical reaction causes micro-cracks in the hose tube (See Figure 1), allowing the coolant to attack and weaken the hose reinforcement.

Accelerated by high-heat and flexing, the hose can develop a pinhole leak or rupture under normal pressure.

Solving the problem

To address the damage caused by ECD, Gates developed an electrochemically-resistant coolant hose using a new EPDM (ethylene propylene rubber) formulation and special wrapped reinforcement.

These new hoses, called Green Stripe II, are long-lasting with no ECD effect. Gates engineers estimate the average service life of more than 750,000 miles for Green Stripe II hoses.

Minimize maintenance

In addition to providing electrochemical resistance, the new EPDM hose offers improved performance characteristics over both standard rubber hose and the much more expensive silicone hose (see Table 1).

Especially important to the service technician is the superior bonding ability of the improved EPDM hose to metal fittings. This characteristic provides a definite advantage over silicone hose when it comes

Table 1
Heavy-Duty Coolant Hose Comparison

Diesel Engine Performance Characteristics (-40 deg. to +257 deg. F) Operating Temperature	Standard EPDM (Black) Hose	Green Stripe II EPDM Hose	Silicone Hose
Electrochemical Resistance	Poor	Excellent	Excellent
Permeation Resistance	Good	Excellent	Poor
Bonding/Sealing at Fitting (Adhesion)	Good	Good	Fair
Cut and Abrasion Resistance	Fair	Fair	Poor
Heat Resistance			
Coolant	Very Good	Very Good	Excellent
Air (Oxygen)	Very Good	Very Good	Excellent
Steam	Fair	Fair	Poor
Resistance to Incidental Exposure to Oil	Fair	Fair	Good
Cold Flexibility	Poor	Very Good	Excellent
Compatibility with Ethylene Glycol	Excellent	Excellent	Excellent
Minimum Burst Requirement (40 psi)	Excellent	Excellent	Excellent
Clamps	PowerGrip SB® Constant Tension (Spring) Type*	PowerGrip SB® Constant Tension (Spring) Type*	PowerGrip SB® Constant Tension (Spring) Type*
Life	Good**	Excellent***	Excellent***
Cost	\$	\$\$	\$\$\$\$

*If fitting is out of round, do not use spring steel-bonded clamps.

** Should last from overhaul to overhaul (500,000 miles).

*** Should last from extended overhaul to extended overhaul (750,000 miles)

to preventing coolant leaks, which are a common problem encountered in heavy-duty cooling systems.

Gates' new EPDM hose also inhibits water in the coolant mixture from permeating through the hose wall. Water loss can cause an imbalance of the antifreeze, which has an adverse effect on the freezing and boiling points, thermal efficiency and component life (e.g. water pumps).

More for your money

If continuous service over 257°F, with temperature spikes over 300°F are common, then silicone hose is still the best choice. When installing silicone hoses, remember that they require either constant tension (spring) type clamps, constant diameter (worm drive) clamps with an inner protective

band, or thermoplastic (PowerGrip® SB) hose clamps. These designs prevent the soft silicone rubber from extruding through or under the clamp.

For a free copy of Gates' 40-page *Fleet, Heavy-Duty and Off-Road Equipment Products Guide*, write to The Gates Rubber Company, c/o The Hibbert Group, 1601 Park Avenue West, Denver, CO 80216. Or, call Gates' "Literature Hotline," 1-800-788-2358. Ask for brochure number 427-8000.



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