

By Jerry Bisbee – ATC Tech Trainer

Determining the Correct Refill or Replacement Coolant

For several years heavy-duty and medium-duty vehicle manufacturers have been building vehicles with a number of different coolant options. Each engine manufacturer has its own brand of coolant. Some of these coolants are "extended life." This means that the effective life of the coolant before replacement is longer than standard coolant. Some of these coolants contain a pre-charge of Supplemental Coolant Additives also known as SCAs. Extended life coolants may contain either Organic Acid Technology (OAT) compounds or Nitrited Organic Acid Technology (NOAT) compounds to reduce damage to engine components from corrosion or cavitation. Coolant manufacturers have started color coding their coolants with dyes to be able



Figure 1

to separate their own coolants. The problem is, at this point at least, there is no industry wide standard for these color codes. Figure 1 shows several of the coolants currently available in Freightliner, Sterling, and Western Star vehicles. As you can see, it is difficult for technicians to determine which of these coolants are in the vehicle by visual inspection. Many customers specify extended life coolants so they can expect long mileage intervals before replacing the coolant. However, if a technician adds the incorrect coolant to these extended life coolants, the extended life capabilities of the coolant are destroyed. The mixed coolant will still work as engine coolant, but its long term corrosion and cavitation fighting ability will be no better than standard coolant. If a vehicle operator does not know that the coolant has been mixed they may think that the coolant in their engine is still safe for the engine for long mileage intervals.

Until there is a standard industry-wide system in place to identify coolant, there are only two ways to find out what coolant should be in a Freightliner, Western Star, or Sterling vehicle. First, look in Module 103 of the bill of materials in PartsPro to find out what coolant was originally installed at the factory. Second, contact the vehicle owner or operator to determine if the original coolant was replaced with a different coolant. Vehicle owners and operators that specify any coolant other than the standard fill coolant should make sure that repair shops know what coolant to add back to the cooling system when repairs are made.

Technicians performing maintenance on diesel truck engines should follow the engine manufacturer's requirements for periodically testing the engine coolant using the test kit recommended by the coolant manufacturer. Failure to do so will

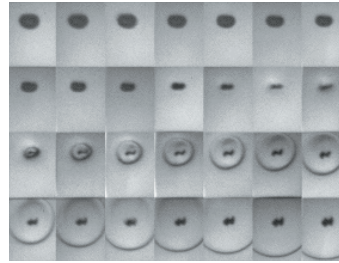


Figure 2

result in catastrophic engine failures. Cavitation erosion is a condition that occurs on the outside of cylinder liners in wet sleeve engines. As the cylinder goes through its power cycle, the outside surface of the liner vibrates because of pressure changes inside the liner. Coolant vapor bubbles form on the liner surface as the coolant goes through pressure fluctuations caused by the vibration. These bubbles implode causing a hydraulic shockwave that removes microscopic particles of the liner metal. Figure 2 shows a sequence of pictures taken of a bubble on a metal surface imploding. The black dot in the pictures is the bubble as it is collapsing. The halo around the collapsing bubble is the shockwave passing through the liquid. Figure 3 is an example of a cylinder liner that was damaged by cavitation. These eroded areas are the result of damage caused by the bubbles imploding. Coolant additives form a coating on the outside of the liner that keeps the bubbles from sticking to the liner.

Truck engine manufacturers publish coolant manuals both in printed version and electronic version. These publications provide vehicle owners with coolant requirements and recommendations for these engines. Vehicle owners, operators, and technicians should refer to these manuals to determine what the engine's coolant requirements are. For example, Detroit Diesel publishes a manual titled Coolant Selections (pub. no. 7SE298) that covers the cooling requirements for Series 60, MBE 900 and MBE 4000 engines. It is available for download at www.detroitdiesel.com. Click on "Support", then "On-Highway", then "Manuals."



Figure 3

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