



EXTENDED LIFE COOLANTS FAMILY OF PRODUCTS



Delo[®]
Let's go further.[®]



EQUIPMENT MAINTENANCE CHALLENGES

Heavy-duty engines face more thermal stress on their cooling systems as engine manufacturers continue to improve fuel economy requirements.

Diesel engine OEMs continue to expand specification requirements for coolant fluids to meet new demanding engine operation, fuel economy standards and performance. This can lead to the use of multiple coolant requirements in mixed fleet applications.

Fleet owners and operators are also focusing on fuel economy improvement by reducing idle time. This has led to more start-and-stop conditions which increase thermal stress on the engine and coolant system, and require the use of high-quality coolants to ensure long-term protection.

The family of Delo® Extended Life Coolants and Delo FleetFix® CME/CMX products help:

- Reduce the number of coolants required to protect diesel engines
- Eliminate the need for supplemental coolant additives (SCAs) and repetitive inhibitor testing
- Minimize operating costs by eliminating costly coolant maintenance
- Extend diesel engine life and coolant system performance

In a wide variety of diesel engine applications and operating conditions, Delo Extended Life Coolant technology provides:

- Superb liner and water pump cavitation protection
- Outstanding corrosion protection for cooling system metals
- Great protection against cavitation induced pitting in wet sleeve liners
- Excellent pH stability
- Low electrical conductivity values
- Greater resistance to hard water than traditional coolants - (it is recommended to use deionized water or premixed 50/50 coolant where possible)



DELO® EXTENDED LIFE COOLANT FAMILY



Delo ELC Antifreeze/Coolant

- Nitrited formulation
- Achieves service life up to 1,000,000 miles / 1,600,000 km / 15,000 hours / 8 years
- Provides up to 32,000 hours / 8 years of coolant system protection for stationary engines
- Lengthens service life up to 1,500,000 miles / 2,400,000 km / 20,000 hours / 8 years of diesel engine coolant system protection when properly maintained with a Delo FleetFix® CME addition at 750,000 miles / 1,200,000 km / 10,000 hours / 4 years
- Fully tested against CAT EC-1
- Meets ASTM D6210
- Delo Warranty Plus protection



Delo XLC Antifreeze/Coolant

- Nitrite-free formulation
- Achieves up to service life of 1,000,000 miles / 1,600,000 km / 15,000 hours / 8 years
- Lengthens service life up to 1,200,000 miles / 1,900,000 km / 20,000 hours / 8 years of diesel engine coolant system protection when properly maintained with a Delo FleetFix® CMX addition at 600,000 miles / 960,000 km / 10,000 hours / 4 years
- Recommended for use in heavy-duty equipment requiring nitrite- and silicate-free coolant, meeting ASTM D6210
- Approved under Detroit DFS93K217
- MB-Approval 325.3 and 326.3
- Recommended for Navistar CEMS B1 Type IIIa requirements
- Delo Warranty Plus protection



Delo Fleet Fix® CME

- Easy conversion, maintenance or extender formula for nitrited or NOAT coolant
- Use with Delo ELC Antifreeze/Coolant or to convert to Delo ELC
- Will not affect freeze point of cooling system
- Can be used in on-road, off-road, or industrial cooling systems
- Available in 12/1 quart cases

DELO® EXTENDED LIFE COOLANT FAMILY



Delo FleetFix® CMX

- Easy conversion, maintenance or extender formula for nitrite free OAT coolant
- Use with Delo XLC Antifreeze/Coolant or to convert to Delo XLC
- Will not affect freeze point of cooling system
- Can be used in on-road, off-road or industrial cooling systems
- Available in 12/1 quart cases



Delo ELI Corrosion Inhibitor

- Nitrited corrosion inhibitor, recommended for use where freeze point is not a concern
- Achieves service life up to 600,000 miles / 960,000 km / 12,000 hours / 6 years in mobile equipment applications
- Up to 32,000 hours / 8 years service life in stationary engines with yearly testing
- Offers excellent elastomer compatibility
- Features low aquatic toxicity, based on recommended mix rate of 5.5-10% wt in water
- Approved for use in Caterpillar engines that do not require freeze protection
- Delo Warranty Plus protection



Delo XLI Corrosion Inhibitor

- Nitrite-free water based corrosion inhibitor recommended for use where freeze point is not a concern
- Achieves service life up to 600,000 miles / 960,00 km / 12,000 hours / 6 years in mobile equipment applications
- Offers excellent elastomer compatibility
- Features low aquatic toxicity, based on recommended mix rate of 5.5-10% wt in water
- Approved against MTU MTL 5049; MAN 248; Wartsila 32-9011; Deutz (TR0199-99-2091); MaK; MWM
- Delo Warranty Plus protection

SPECIFICATIONS AND OEM RECOMMENDATIONS

Delo® ELC Antifreeze/ Coolant is approved for:

- Deutz DQC CB-14

Delo ELC Antifreeze/ Coolant meets the specifications of:

- ASTM D6210
- ASTM D3306
- Caterpillar EC-1
- Detroit Series 60 and DD15 engines per SVC BRO 0002
- Navistar B1 Type 3
- TMC RP 329, 302A, 351 (color)

Delo ELC Antifreeze/Coolant is recommended for:

- Caterpillar Stationary Natural Gas Engines
- Cummins QSK, QST, ISX 15, ISX, ISM, ISL, ISC and ISB Diesel Engines
- Cummins Westport ISX 12G and ISL G CNG engines
- Freightliner and Western Star Truck Diesel Engines
- GE - Jenbacher Stationary Natural Gas Engines
- Hino Truck Diesel Engines
- Isuzu Truck Diesel Engines
- Kenworth and Peterbilt Truck Diesel Engines
- Kobelco Construction Equipment Diesel Engines
- Komatsu Construction Equipment Diesel Engines
- MTU 4000 Diesel Engines
- Navistar Truck Diesel Engines
- Scania and MAN Truck Diesel Engines
- Volvo and Mack Truck Diesel Engines
- Wärtsilä Stationary Diesel Engines
- Waukesha Stationary Natural Gas Engines
- White-Superior Stationary Natural Gas Engines



Delo XLC Antifreeze/ Coolant is approved for:

- Cummins CES 14439
- Detroit Diesel DFS93K217ELC
- Deutz DQC CB-14
- Komatsu KES 07.892
- MAN 324 Type SNF
- MB-Approval 325.3 (Concentrate)
- MB-Approval 326.3 (Premixed 50/50)

Delo XLC Antifreeze/Coolant meets the specifications of:

- ASTM D3306
- ASTM D6210
- DAF 74002
- MTU MTL 5048
- TMC RP 364

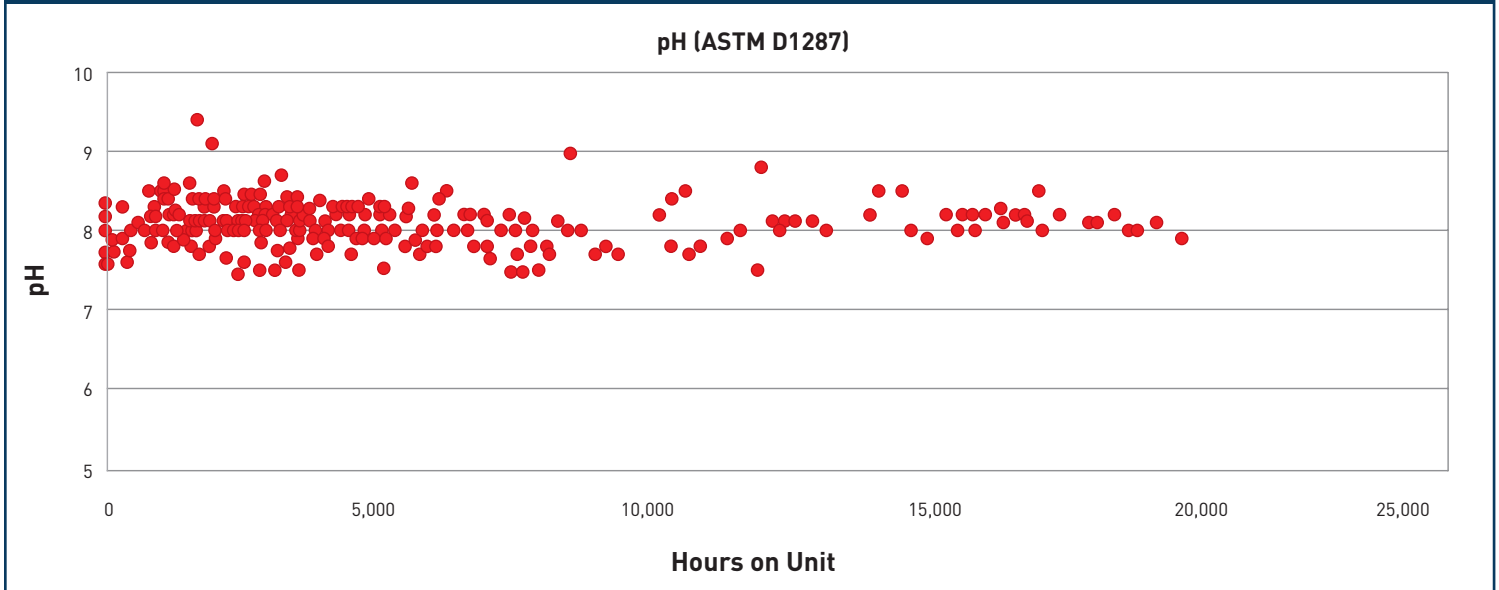
Delo XLC Antifreeze/Coolant is recommended for use in:

- GE - Jenbacher Stationary Natural Gas Engines
- Hino Truck Diesel Engines
- Isuzu Truck Diesel Engines
- Kobelco Construction Equipment Diesel Engines
- MTU 2000/4000 Diesel Engines
- Navistar MAXXFORCE Engines
- Scania Truck Diesel Engines
- Volvo Construction Equipment (VCE) Diesel Engines
- Volvo and Mack Truck Diesel Engines
- Wärtsilä Stationary Diesel Engines
- Vestas Wind Turbine Power Electronics External Coolant System
- European HD OEMs that require both Phosphate-free and Nitrite-free formulations



EFFECTIVE CORROSION PREVENTION

Chart 1: Delo® Extended Life Coolant pH Stability Performance (ASTM D 1287)



Patented carboxylate inhibitors in Delo Extended Life Coolants effectively protect against pH shifts.

When coolant breaks down (or oxidizes), acids are released that cause pH instability, increasing the potential for corrosion. Internal Chevron laboratory testing demonstrates the inhibitors in Delo Extended Life Coolants help maintain stable pH levels and prevent corrosion.

Chart 1 shows that over time, the pH of Delo Extended Life Coolants in fleet engines remains virtually unchanged – regardless of the engine age.

Shown to the right are real world examples of radiators that show the impact of stable and unstable pH performance.

Radiator Corrosion Protection

Excellent pH Performance
Provided by Delo ELC

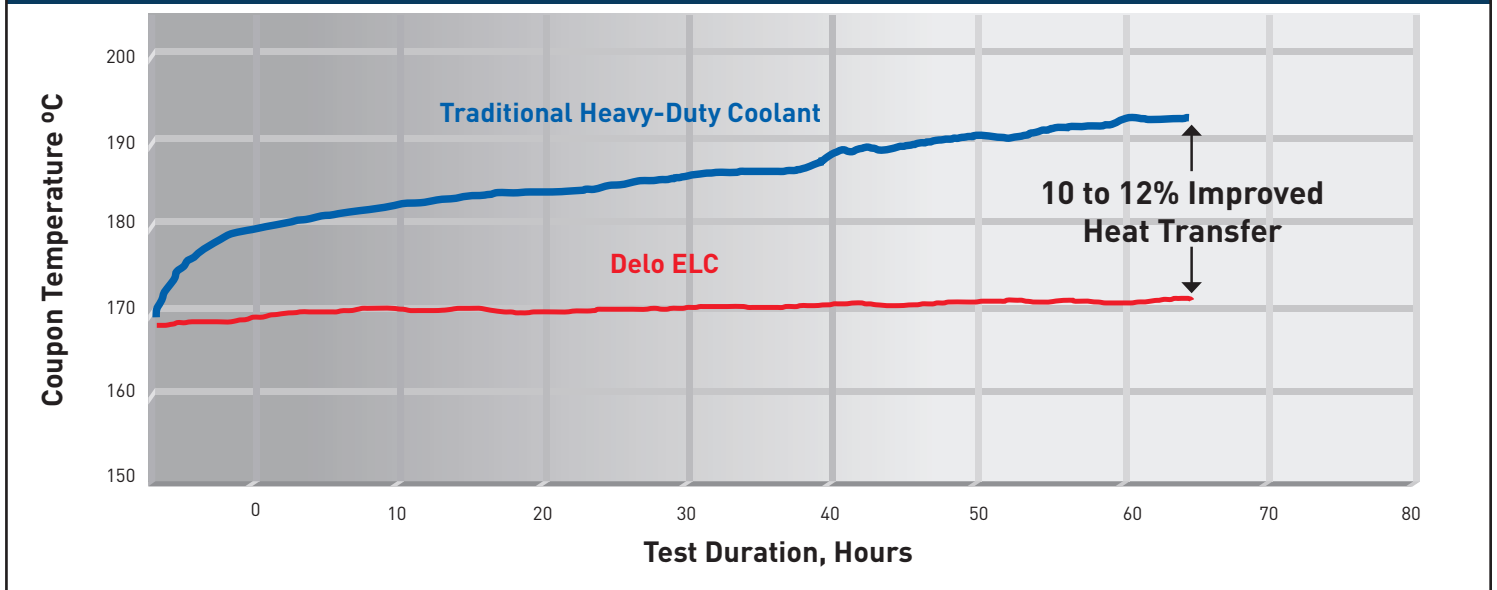


Unstable pH Performance from
a Competitor-Recycled Extended
Service Coolant



HEAT TRANSFER ADVANTAGE

Chart 2: Delo® Extended Life Coolant Heat Transfer Properties - Coupon Test



Compared to coolants containing silicate, Delo Extended Life Coolants maintain like-new heat transfer.

Chart 2 shows Delo Extended Life Coolants' superior results in laboratory tests comparing heat transfer properties. This heat transfer advantage delivers important customer benefits:

- Longer engine life
- Improved coolant life
- Ability to increase productivity of equipment - less downtime
- Reduced coolant system maintenance required

Piston Liner Exterior

Delo ELC

This liner shows the excellent performance attributed by Delo ELC in preventing cavitation and eliminating silicate buildup.



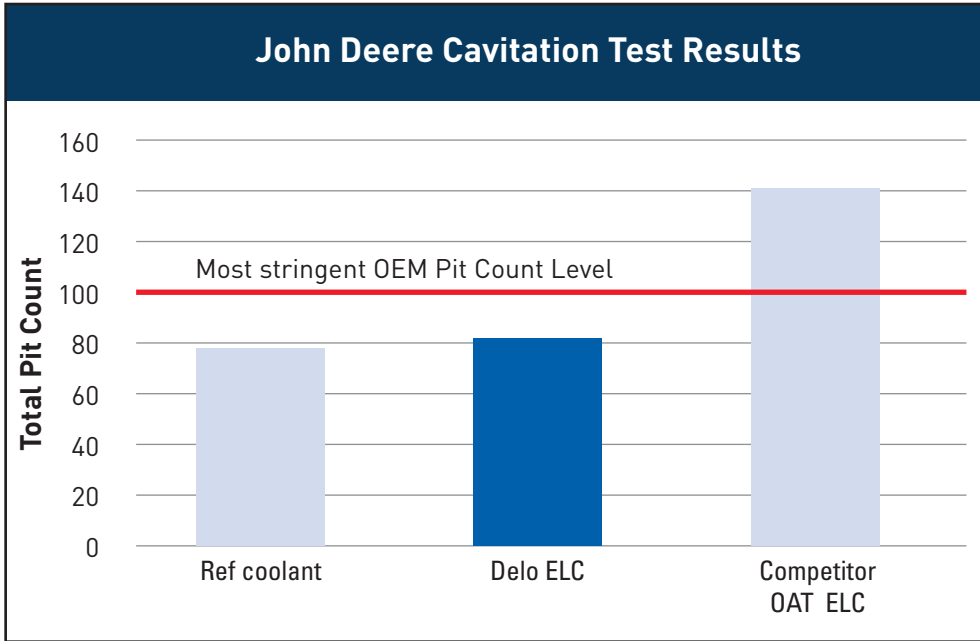
Traditional Heavy-Duty Coolant

This liner is in poor condition with silicated scale buildup that can inhibit heat transfer performance and reduce engine life over time.



EXCELLENT LINER PROTECTION

Bench-test data shows how well Delo® ELC Antifreeze/Coolant protects liners from pitting due to cavitation.



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Piston Liner Protection

On-Road Engines

In severe on-road driving conditions, Delo ELC still provides excellent pitting protection as shown in this Detroit Diesel Series 60 piston liner with over 1.5 million miles.



Off-Road Engines

In harsh off-road operations, Delo ELC still provides excellent pitting protection as shown in this MTU 4000 piston liner with over 21,000 hours.



MAINTAINING DELO® EXTENDED LIFE COOLANTS

Keeping your engines operating efficiently takes high-performing, extended life coolant plus a good coolant maintenance program.

Follow these steps to help maintain optimal Delo ELC or Delo XLC performance:

Step 1. Visually inspect coolant color and coolant level in overflow tank.

Step 2. Top up coolant as needed using only Delo ELC Antifreeze/Coolant Premixed 50/50 or Delo XLC Antifreeze/Coolant Premixed 50/50.

Step 3. Check freeze point with a refractometer at every scheduled inspection and adjust as needed.

Step 4. Test coolant condition twice per year using pH and nitrite coolant test strips. (nitrite test strips only required for Delo ELC testing).

Step 5. Test corrosion inhibitors using Delo FleetFix® Extended Life Coolant Dilution Test Kit on a yearly basis.

USE THE DELO COOLANT MAINTENANCE KIT TO EASILY CHECK ON DELO ELC/XLC PERFORMANCE.



Delo Coolant Maintenance Kit includes:

- | | |
|------------------------|--|
| 1. Refractometer | 4. Carboxylate test strips |
| 2. pH test strips | 5. FleetFix® Dilution test kit |
| 3. Nitrite test strips | 6. Sample taking tools |
| (Delo ELC Kit Only) | 7. Chevron "How To" Series Reference Materials |

CONVERTING TO DELO® EXTENDED LIFE COOLANTS

When converting from another product to Delo ELC/XLC, you have a choice of conversion methods. For optimum performance, the Drain, Flush & Fill method is recommended.

Optimal Protection Method

Drain Flush & Fill

Procedure:

1. Drain the current coolant and inspect hoses and clamp fittings.
2. Flush with clean deionized/distilled water.
3. Refill with Delo ELC or Delo XLC Antifreeze/Coolant Premixed 50/50.
4. Check coolant system freeze point with a refractometer.

Reference Chevron How To Series - Converting a vehicle coolant system using the drain, flush and fill method.

Acceptable Change Method

Drain & Fill

This is the next-best option for ensuring optimal product performance and coolant system protection. With this option, up to 10% of the previous coolant can be left in the cooling system.

Procedure:

1. Drain the current coolant and inspect hoses and clamp fittings.
2. Refill with Delo ELC/XLC Antifreeze/Coolant Premixed 50/50.
3. Check coolant system freeze point with a refractometer.

Reference Chevron How To Series - Converting a vehicle coolant system using the drain and fill method.

Reduced Coolant Waste Method

Delo FleetFix® CME/CMX

This is best option for larger fleets that cannot drain and flush all vehicles, or to avoid the expense associated with large amounts of coolant waste. This method safely converts a system to achieve excellent protection while helping to minimize waste.

Procedure:

1. Check coolant dilution level with a refractometer – ensure a premixed 50/50.
2. Test pH of coolant with a pH test strip.
3. Based on results of tests above, drain, flush and refill cooling system with either Delo ELC /XLC Antifreeze/Coolant Premixed 50/50. If existing coolant is in satisfactory condition and to reduce add Delo FleetFix CME, or Delo FleetFix CMX, as directed.
4. Check the new coolant in system with a refractometer.
5. Mail coolant system samples collected for testing.

Reference Chevron How To Series - Converting a vehicle coolant system using Delo FleetFix CME/CMX.





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