Extended Life Coolants Family of Products

CALTEX

Delo®

Let's go further.™

Kool Tools

Product Information

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 Coolant products helps:

- 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 ELC / Delo XLC 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
- Less affected by 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® XLC Antifreeze/Coolant

*Also available in Premixed 50/50 coolant ready for use

- Nitrite-free formulation
- Achieves service life up to 960,000 km. / 15,000 hours / 8 years
- Recommended for use in heavy-duty equipment requiring nitrite-and silicate-free Coolant, meeting ASTMD6210
- Approved for use under Detroit Diesel 93K217
- Approved for use under Mercedes-Benz DBL7700.30 MB class 325.3
- Recommended for Navistar CEMS B Type IIIa engines

Specifications and Meet the Requirement of:
- ASTM D 3306
- ASTM D 6210
- TMC RP 364

OEM Recommendations
- DDC93K217
- MB325.3
- MAN 324 Type SNF
- MTU MTL 5048
- Navistar CEMS B1 Type IIIa
- GE-Jenbacher
- Volvo / Mack
- MWM
- John Deere
- MTU2000 / 4000 series engines

Delo® Extended Life Coolant Family

Delo® XLI Corrosion Inhibitor

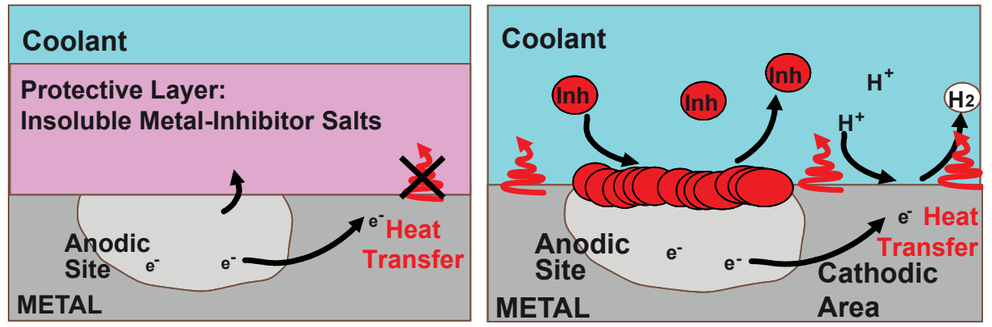
*Also available in Premixed coolant ready for use

- Concentrated version of corrosion inhibitor
- Recommended where freeze point is not of a concern
- Achieves service life up to 960,000 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 MAN B&W D36 5600; MAN 248; Wartsilla 32-9011; Deutz (TRD199-99-2091); MaK; MWM

OEM Recommendations
- Detroit Diesel
- Deutz (TR0199-99-2091)
- GEC Alsthom Ruston
- Liebherr MD 1-36-130 (DCA)
- MAN 248
- MB 312.0
- MTU MTL 5049
- MWM
- Scania TI 2-98 0813 TB
- Sulzer Diesel ZBS0503.doc
- Ulstein Bergen
- Wartsila 32-9011
- Yanmar

How does Delo® Extended Life Coolant Protect your Cooling System?

Older vs. Newer Technology in Corrosion Protection Mechanisms

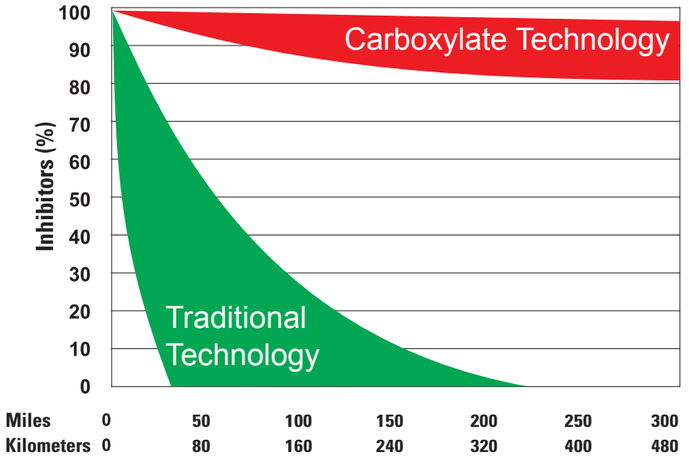


Traditional Technology: Corrosion protection provided by blanket protection which reduces heat transfer performance

Carboxylate/OAT*: Prevents corrosion protection at the spot required and allows for maximum heat transfer performance

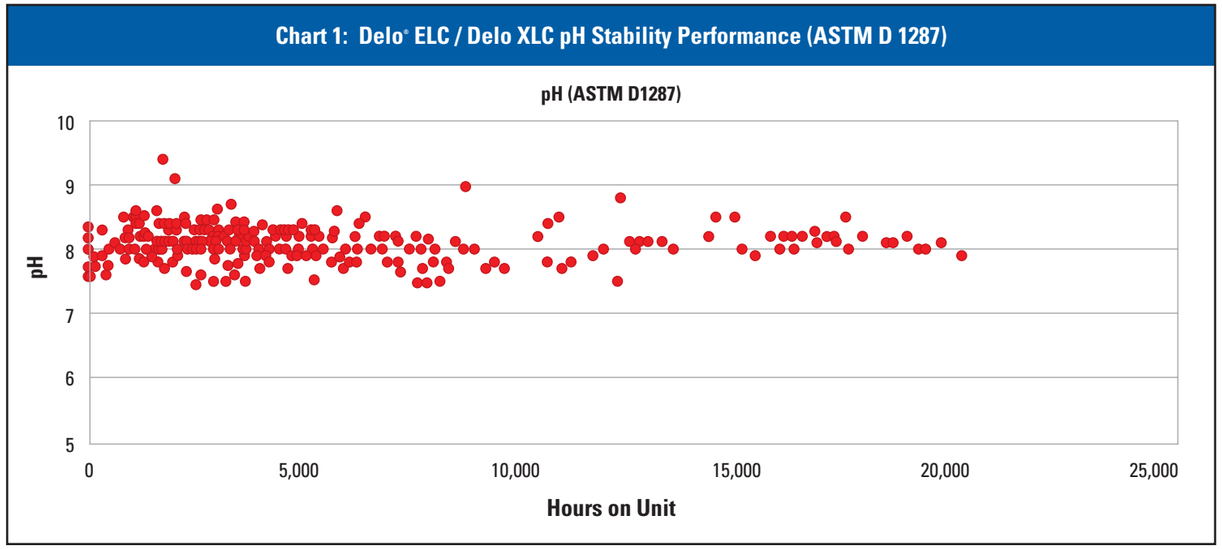
***OAT = Organic Acid Technology**

Extended Life vs. Traditional Technology Rates of Additive Depletion



- Conventional coolants (green) require re-inhibition as early as 25K miles (40K km)
- Carboxylate / OAT Technology (Red) can achieve up to 750K miles (1.2K km) of coolant system life.

Effective Corrosion Prevention



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.

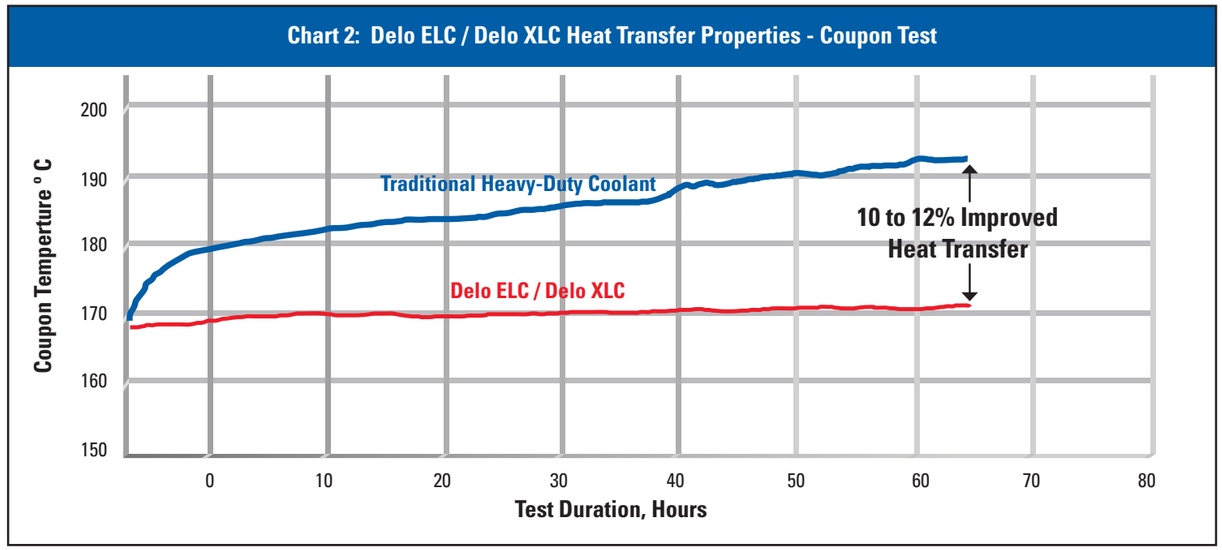
Shown to the right are real world examples of radiators that show the impact of stable and unstable pH performance.

Radiator Corrosion Protection

Excellent pH Performance Provided by Delo ELC / Delo XLC

Unstable pH Performance from a Competitor-Recycled Extended Service Coolant

Heat Transfer Advantage



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 XLC

This liner shows the excellent performance attributed by Delo XLC 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.

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 XLC performance:

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

Step 2. Top up coolant as needed using only Delo XLC 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 test strips.

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

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

Delo Coolant Maintenance Kit includes:

1. Refractometer
2. FleetFix Dilution Test Kit
3. pH test strips
4. Carboxylate test strips
5. Beakers
6. Pipettes
7. Kool Tools How to Reference Guides

Converting to Delo® ELC or Delo® XLC Antifreeze / Coolants

When converting from another product to Delo ELC or Delo XLC, you have a choice of conversion methods. For optimum performance, the Drain, Flush & Fill 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. Turn on vehicle and allow water to circulate for approximately 15 minutes.
4. Fully drain water from cooling system and properly dispose.
5. Refill with Delo ELC Premixed 50/50 or Delo XLC Premixed 50/50.
6. Turn vehicle back on and circulate new coolant for approximately 15 minutes - shut off truck and let cool.
7. 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 Premixed 50/50 or Delo XLC Premixed 50/50.
3. Turn vehicle back on and circulate new coolant for approximately 15 minutes - shut off truck and let cool.
4. Check coolant system freeze point with a refractometer.

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

Delo® XLC Proof of Performance – Freestate Petroleum Trucking

Delo XLC technology has performed for billions of kilometers in heavy-duty trucks across the globe.

Freestate Petroleum, located in South Africa, has used Delo XLC technology in its fleet of over-the-road trucks since 2005. Trucks average close to 120,000 kilometers per year hauling bulk petroleum products across South Africa in extreme conditions - severly stressing their coolant system.

To see the protection of Delo XLC, company mechanics recently tore down a Cummins ISX 500 HP engine that had a total of 1.1 million kilometers and had run extended oil drain intervals to inspect the cooling system and check its performance (actual engine parts shown below).

The owners of Freestate Petroleum and the OE dealer mechanics were impressed to see no visible corrosion, rust or any scale buildup in the cooling system of the engine. Furthermore, the radiator and water pump were in such good condition they could be reused according to the on-site OE dealer mechanics.

It's this type of performance that customers can expect from Delo XLC to protect their engines and help minimize total operating costs.

After 9 years of operation using Delo XLC technology we are extremely pleased at the pristine condition of the cooling system.

Jean Snyman
Owner
Freestate Petroleum Trucking

Piston Liner

Clean of any silicate or phosphate scale buildup allowing excellent heat transfer performance; no visible liner pitting showing excellent cavitation protection.

Radiator Tubes

Clean with no silicate or corrosion buildup allowing for excellent fluid circulation and heat transfer.

Water Pump Impeller & Housing

In excellent condition and can be reused without any additional maintenance required.

Thermostat

Visibly clean, in excellent working condition and could be reused.

Delo® XLC Proof of Performance – Frasier Alexander Mining

Delo XLC has performed for millions of hours in off-road equipment across Africa, the Middle East, Europe and Asia Pacific providing excellent coolant system reliability in construction, mining, and agricultural equipment.

Frasier Alexander Mining operates a coal mine out of Botswana, Africa and has used Delo XLC technology for a number of years in their Bell Articulated truck engine cooling systems. After achieving more 21,000 hours of operation they chose to teardown their engine and cooling system to inspect the performance of Delo XLC.

Company mechanics tore down the Bell Articulated mining haul truck engine to review the cooling system performance and how well Delo XLC protected their investment (actual engine parts shown to the right).

The inspection of the cooling system parts showed no visible corrosion or cavitation and very good protection offered by Delo XLC after 21,000+ hours of operation.

Frasier Alexander indicated that the teardown and inspection further convinced them that they made the right investment in Delo XLC to maintain equipment reliability.

In the harsh and dirty conditions of coal mining in Africa, Frasier Alexander has used Delo XLC technology to ensure excellent equipment reliability.

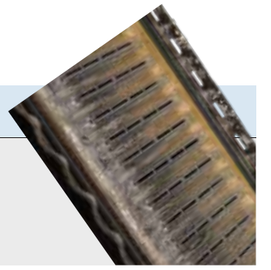
Theo Wilcox
Technical Manager
Frasier Alexander Mining

Water Pump Housing & Impeller

Free from visible cavitation or corrosion; Delo XLC has protected the water pump and impeller very well. This part could be reused again.

Radiator

Clearly clean and free of any corrosion or scale buildup. Allows for excellent circulation of coolant and optimal heat transfer.



Thermostat

Shows no scale deposit formation and capability for continued use. Housings are also clean and show great protection of Delo XLC against harmful corrosion.

*Some products may not be available in Malaysia.

www.CaltexDelo.com

A **Chevron** company product

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