



WELCOME

*Your Performance
Advantage*

A **Chevron** company brand

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Global Lubricants





Are You Making a Smart Coolant Investment?





Chevron Coolant/Anti-Freeze Products

Definitions

Coolant – product/component that allows increased cooling

- Water

Anti-Freeze – product/component that keeps a material from freezing

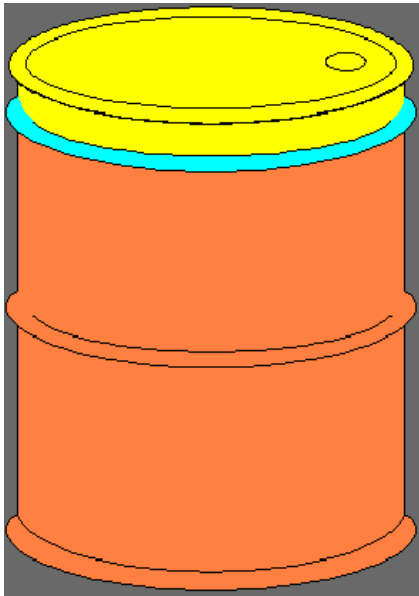
- Glycol
 - Ethylene – most common type of glycol used in heavy duty and automotive applications. Highly toxic.
 - Propylene – only type of glycol acceptable if contact with food is possible. Not highly toxic

Inhibitors

- Formulation materials in a coolant/antifreeze that protect cooling system components. Unique part of a coolant/antifreeze formulation

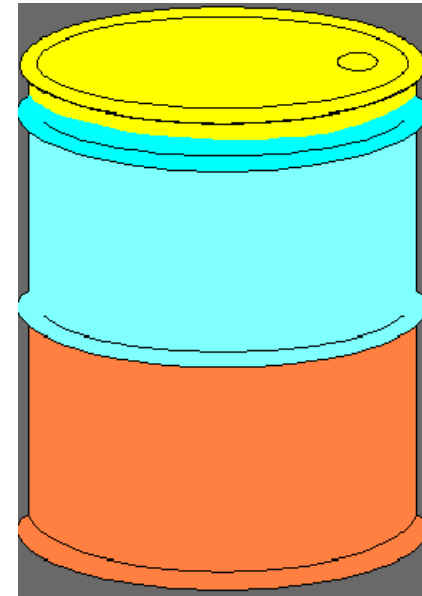


Base fluid and Additives



CONCENTRATE

5% ADDITIVES 2.5%
3% WATER 51.5%
92% GLYCOL 46%



50/50 MIXTURE



Chevron Coolant Product Formulations

Chevron offers 3 basic coolant types

Conventional Coolants – Chevron Supreme

- Green color, silicate containing, borate/phosphate technology
- Mostly automotive applications
 - In heavy duty must have supplemental coolant additives added.

Fully Formulated Coolants – Chevron Heavy Duty

- Purple color, silicate containing, borate based, phosphate free with nitrite and molybdate.
- Mostly heavy duty but some are now used in automotive applications. (Chevron Custom Made)
 - Contain first dose of supplemental coolant additives
 - Must have supplemental additives used as per testing results.

Extended Life Coolants – Chevron Delo Extended Life Coolant

- Red color, carboxylate based with nitrite and molybdate.
- Contain no phosphate, borates, nitrates or silicates
- Do not require supplemental coolant additives.



Conventional Coolants

Old technology coolants containing silicates that are no longer used by any automotive or heavy duty OEM for factory fill in the United States.

Issues

Short life span – change-out recommended every 200,000 miles to 250,000 miles.

Short shelf life – 18 months to 2 years

Not effective at protecting aluminum



Fully Formulated Coolants

1970's technology developed specifically for HD applications

Nitrite and/or Nitrite/Molybdate added to prevent liner cavitation

Silicate based

- Stability issues

Limited lifetime

- 200,000 to 250,000 miles

Inhibitors require refortification to maintain effectiveness.

Limited ability to protect aluminum



Extended Life Coolants

Revolutionary inhibitor technology benefits

- Non-silicate containing
- Virtually non-depleting inhibitors
- Protect in a different way
- Requires almost no maintenance
- Requires no regular testing
- Does not need additional inhibitors (SCA's – supplemental coolant additives)
- Reduces overall cost of cooling system maintenance from the product side and repair side.
- Improves cooling system hardware life



History of Extended Life Coolants

1994

- CAT EC-1 is released
- Extended Life Coolant meets CAT EC-1
- 150,000 miles + extender + 150,000 miles = 300K total
- 6,000 hours with an extender at 3000 hours

1999 mileage claims for extended life service extended to:

- 300,000 miles + extender + 300,000 miles = 600K
- 400,000 miles with no extender

2005

- Delo ELC's formula has become either factory fill or factory option at all major US Truck OEM's.

2006

- Delo ELC formulation enhanced to improve service life, lower maintenance costs and improve performance



Delo ELC Service Claims

Mileage and Performance Claims

- 750,000 miles/15,000 hours/8 years
 - *With Extender*
 - 1,000,000 miles/20,000 hours/ 8 years (Extender at 500,000 miles/10,000 hours/ 4 years)
- Reduced Electrical Conductivity
- Improved Corrosion Protection
- Improved heat transfer
- Outstanding protection of all cooling system components especially in high temperature conditions
- Improved water pump life
- Long term stable formulation due to lack of silicates
 - No silicate gel or deposits
- No SCA additions
 - Reduced maintenance costs/Reduced maintenance time



Delo® ELC - Enhanced Formulation Testing

How do we arrive at our performance claims?

Our claims for Delo ELC are based on solid research and extensive fleet testing experience.

Teardown in conjunction with major fleet customer and major OEM's

Appropriate vehicle, service type and test interval selection.

- Factory filled with ELC
- No major repairs during operational history
- High mileage, heavy load



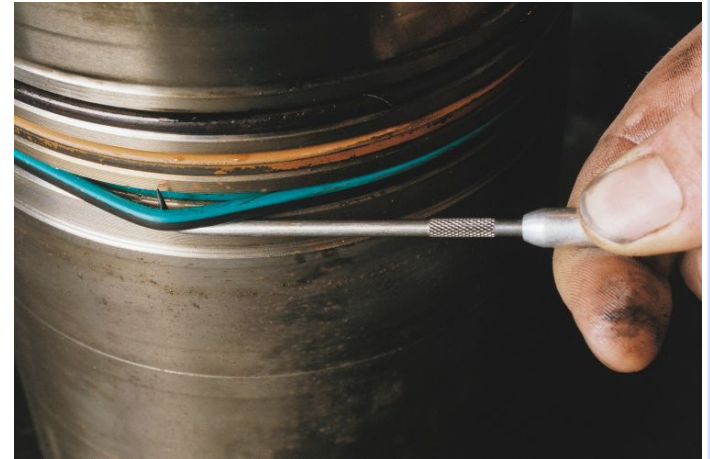
Fleet Tested Performance



Teardown Observations:

No visible pits in any of
the 24 liners inspected

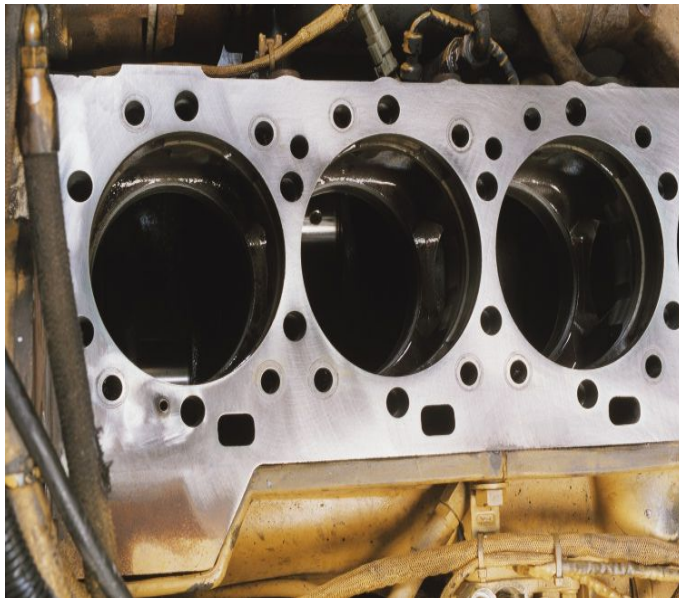
All elastomers in like-
new condition





Fleet Tested Performance

Fleet Test Results



Observations:

- No observable pitting in any of the coolant head and block passages
- Minimal flash rust observed



Fleet Tested Performance



Observations:

- Records indicate minimum 500K life on all pumps
- One pump was original at 700K. (Average water pump life = 250,000 miles)
- Cover showed only minor erosive damage
- Impeller like new

Original water pump with 700,000 miles



Fleet Tested Performance



Observations:

- No leaks in any radiator
- Possible minor solder corrosion
- Minimal deposits
- No plugging evident





Fleet Tested Performance



Observations:

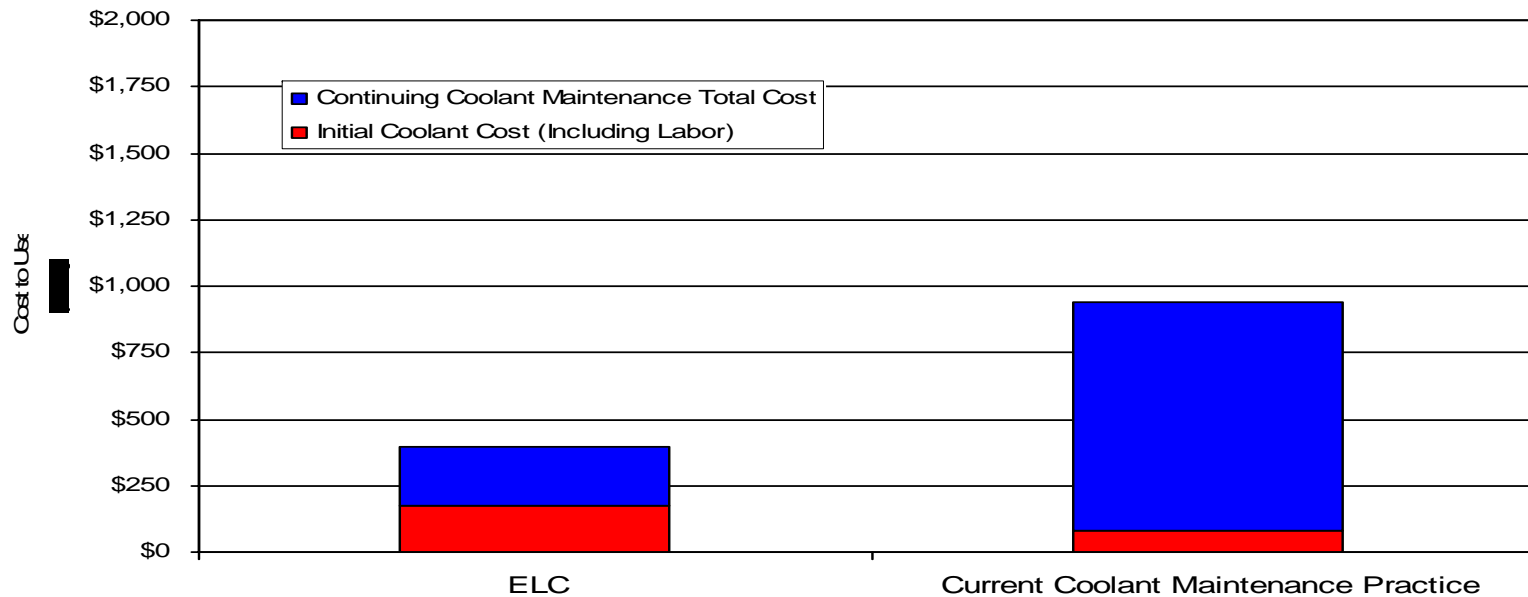
- Thermostat housing shows minimal aluminum corrosion
- No corrosion observed at dissimilar metals' junction
- Thermostats operational



Enhanced Cost Savings New Claims Improve ROI

Delo

Single Engine Cost Comparison Improved ELC vs Pre 2006 ELC Maintenance Practice



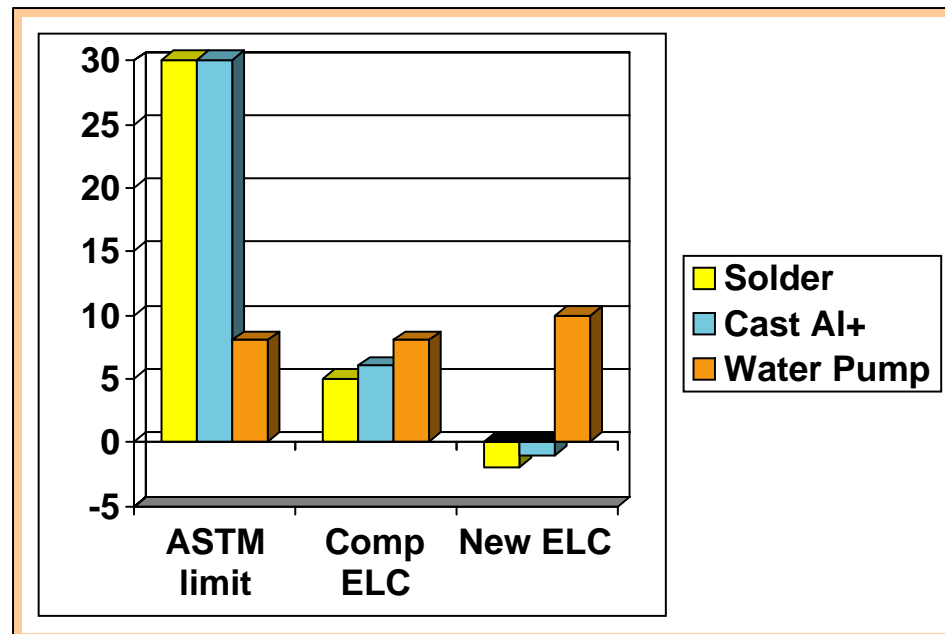
\$398.50 to **\$941.83**
New ELC Formulation Advantage = \$543.33/truck savings over 750,000 miles



Delo[®] ELC Enhanced Performance

Improved corrosion protection

ASTM D3306
Solder Protection
Cast Aluminum Protection
D2809 Water Pump Test

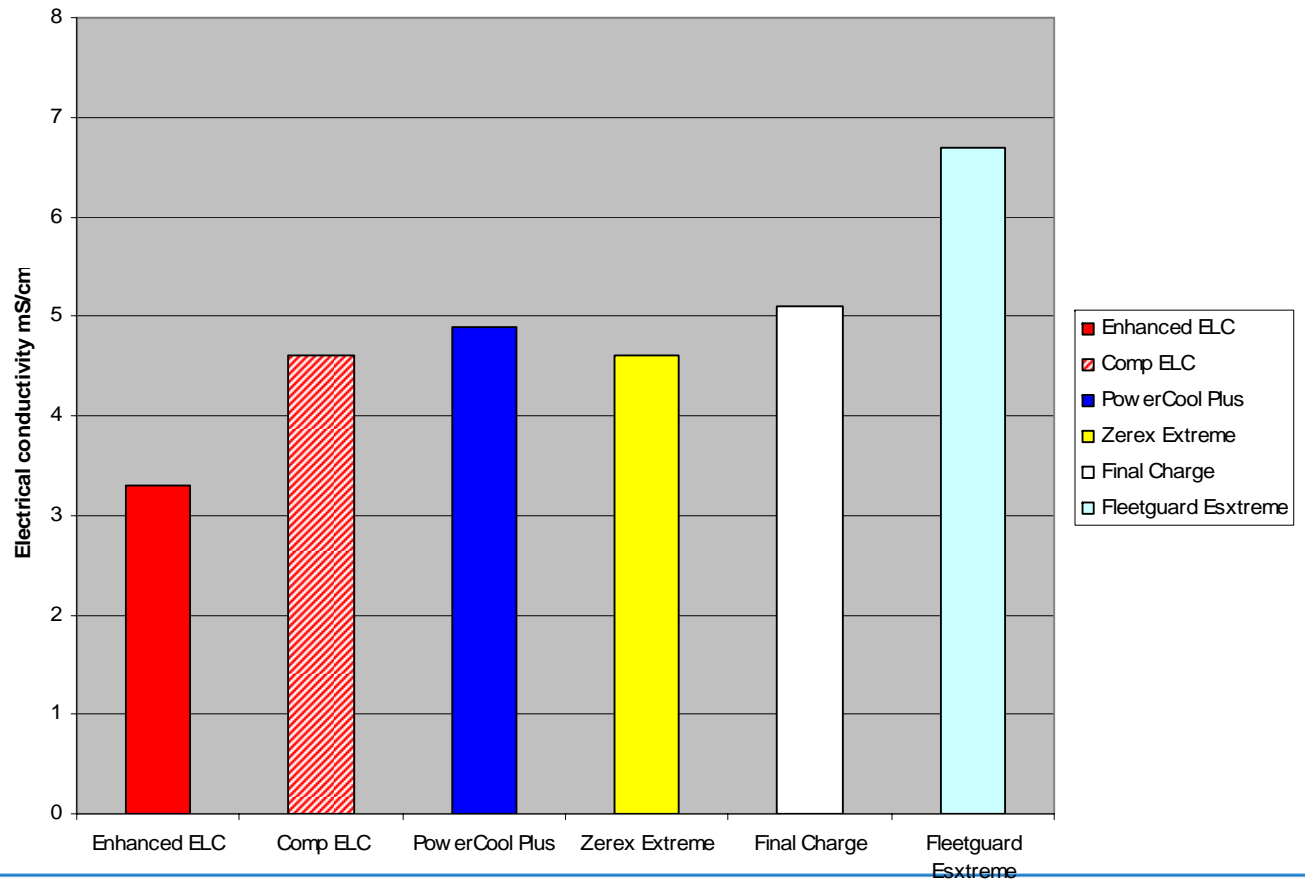




Delo[®] ELC Enhanced Performance

Lower Electrical Conductivity

Electrical conductivity





Delo[®] ELC Enhanced Performance

Lower Oxidation Products at high temperatures

Coolant Name	Oxidation Acids (ppm) 33% dilution at 185°C (Internal Test Procedure)
Delo ELC	333
PowerCool Plus (Old World Formulation)	988
Zerex Extreme	4186
Zerex GO-5	2800



EGR Challenges - High temperature

Oxidation of glycols (ethylene and propylene glycol)

Formation of acidic compounds: glycolic, formic, oxalic acid

reduction of pH

reduction of reserve alkalinity

increased corrosivity

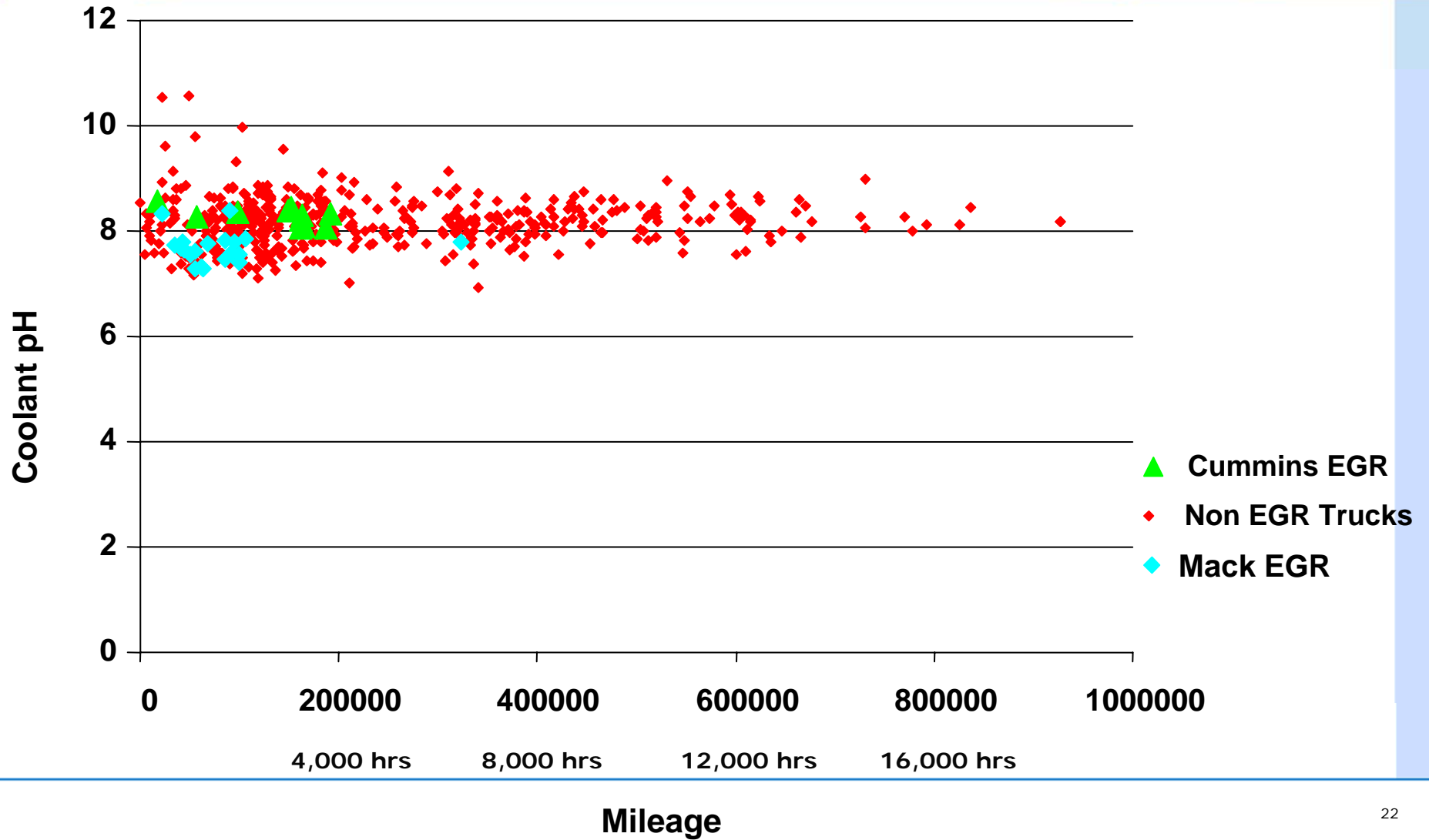
potential loss of stability of corrosion inhibitors

reduction of inhibitor performance

Shortening coolant lifetime



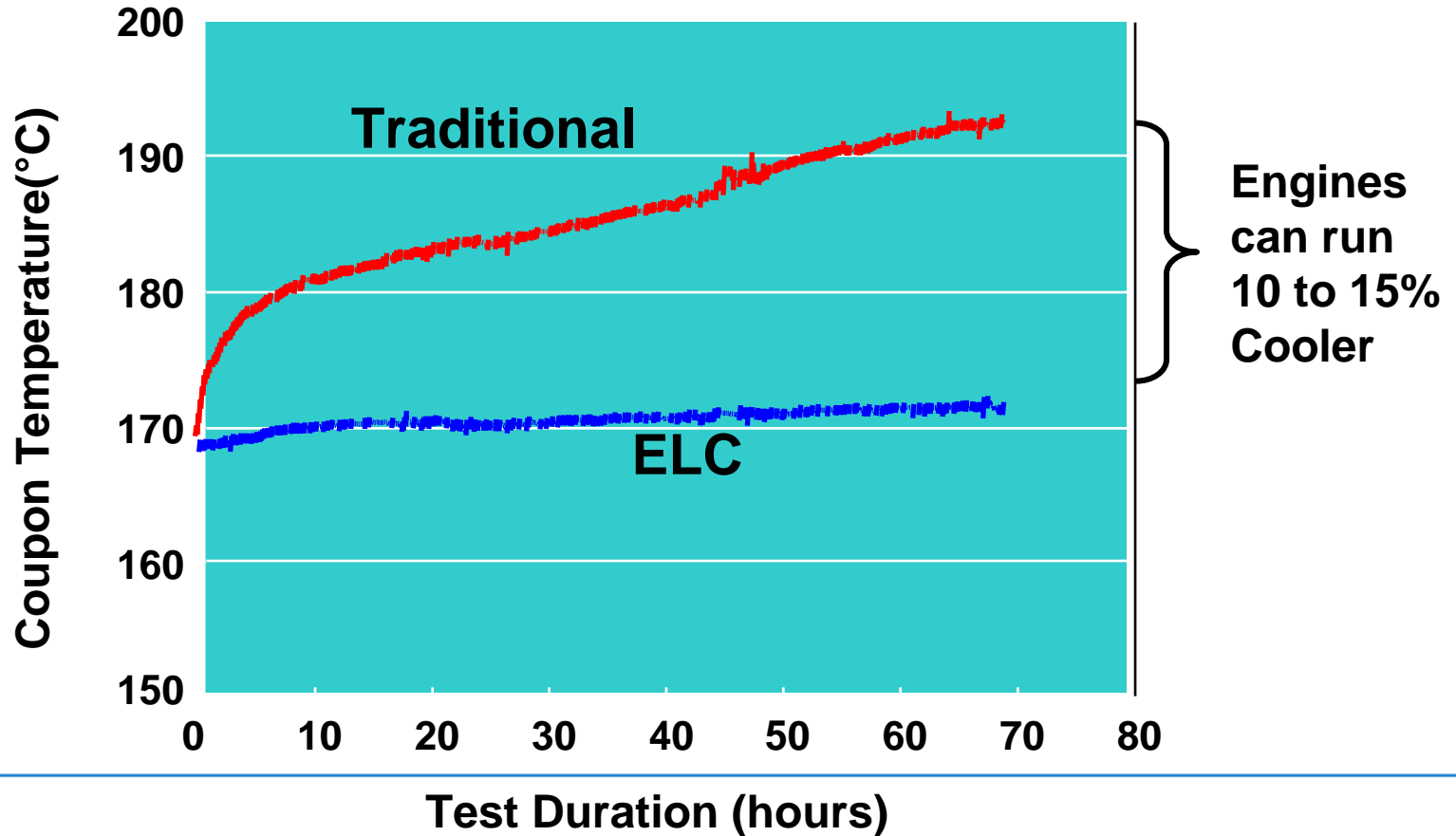
ELC Carboxylate Stability & EGR Engines





Delo[®] ELC: EGR and Heat Transfer

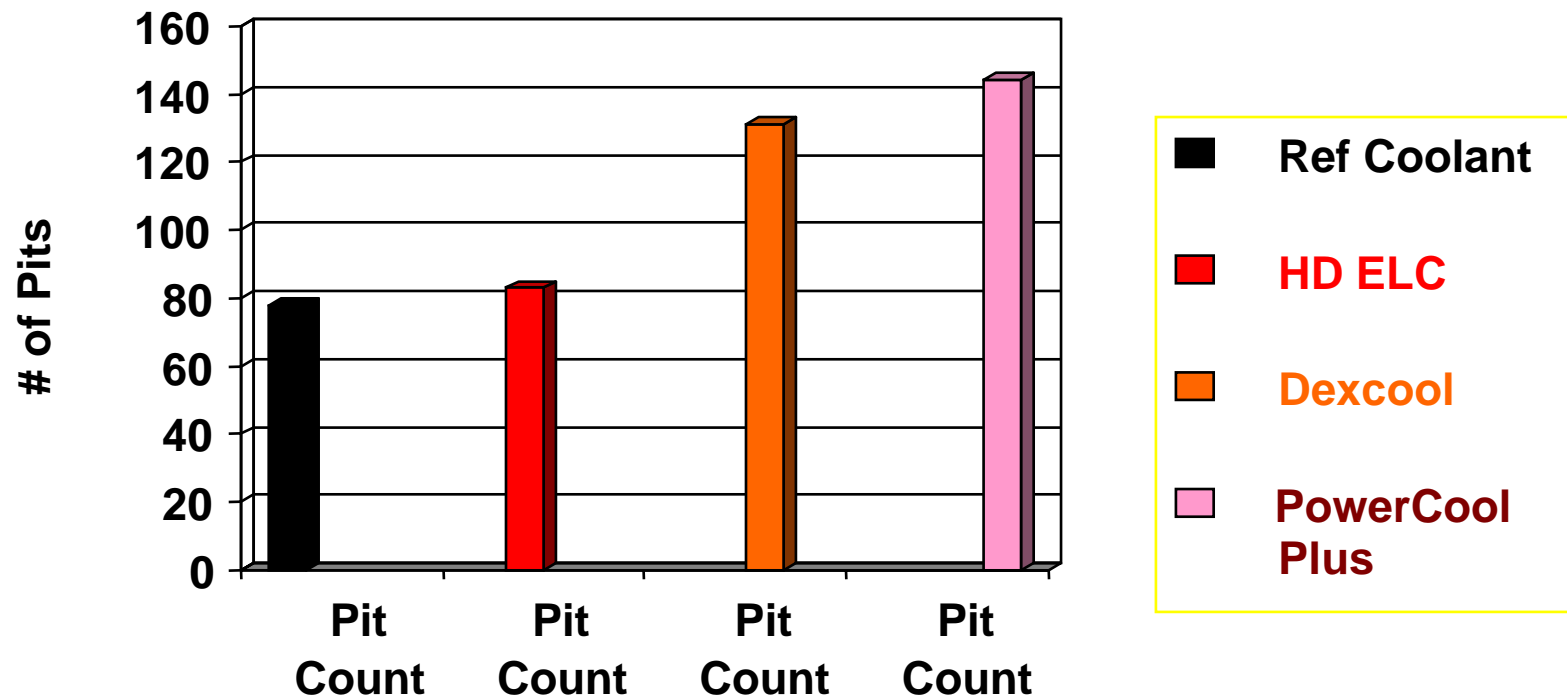
Dynamic Heat Transfer Test





Industry Leading Cavitation Protection

John Deere Cavitation Test





Delo[®] ELC Benefits Summary

Delo ELC provides

More miles with or without Extender than most competitors

- 750,000 miles/15,000 hours/8 years with no Extender needed
 - 150% better than competitors that require Extender at 300,000 miles
- 1,000,000 miles versus 600,000 miles with Extender
 - 67% better overall service life versus competitors
- More savings to end-user
- Enhanced Corrosion Protection
- Lower Electrical Conductivity
- Lower glycol breakdown products compared to major US Extended Life formulas
- Excellent results in John Deere Cavitation Test
 - Performed better than PowerCool Plus



Delo[®] ELC Benefits Summary (cont'd...)

- Differentiated formulation from Shell Rotella ELC
- Globally consistent formula
- Meets the full extent of all ASTM specifications including the new ASTM D 6210 Heavy Duty Specification
- Has been fully qualified against Cat EC-1 spec
 - Very few competitors actually have tested their fluid against the Cat EC-1 spec
- Has been in use in major US fleets more than any other formula claiming Extended Life properties.
- Can be tested for carboxylate inhibitor levels using patented method.
- Improved hardware life
- Water pumps – up to 75% longer life
- Improved heat transfer – engines run 10 to 12% cooler