

Caterpillar Lube Oil



DEO
Diesel Engine
Oil



FDAO
Final Drive/
Axle Oil



HYDO
Hydraulic Oil



GO
Gear Oil



NGEO
Natural Gas
Engine Oil



MTO
Multipurpose
Tractor Oil



TDTO
Transmission and
Drive Train Oil

Benefits of Cat Oil and Greases

- Are specially developed for Cat equipment to obtain highest component life and performance
- Allow Cat equipment to reach the highest productivity level with lowest maintenance costs
- Capable of long drain intervals
- Optimal operation cost, and the lowest maintenance cost
- Are part of the full design of the machine, as an original genuine part with the following principles:
 - Developed using Caterpillar extensive expertise of Cat machines
 - Rigorous Cat proprietary component testing
 - Run in actual Cat field tests to validate real world performance
 - Dedicated formulation
- Is the best recommendation for Cat machines and warranted by Cat

Fundamental for a High Performance Lubricant

- Application expertise to define oil requirements
- Formulation expertise to select
 - Quality base stocks
 - Performance additives
 - Balance formulation to achieve best overall performance
- **Practice/ Field related test procedures to verify performance**
- High quality production capabilities to produce oil
- Control systems to guarantee oil quality

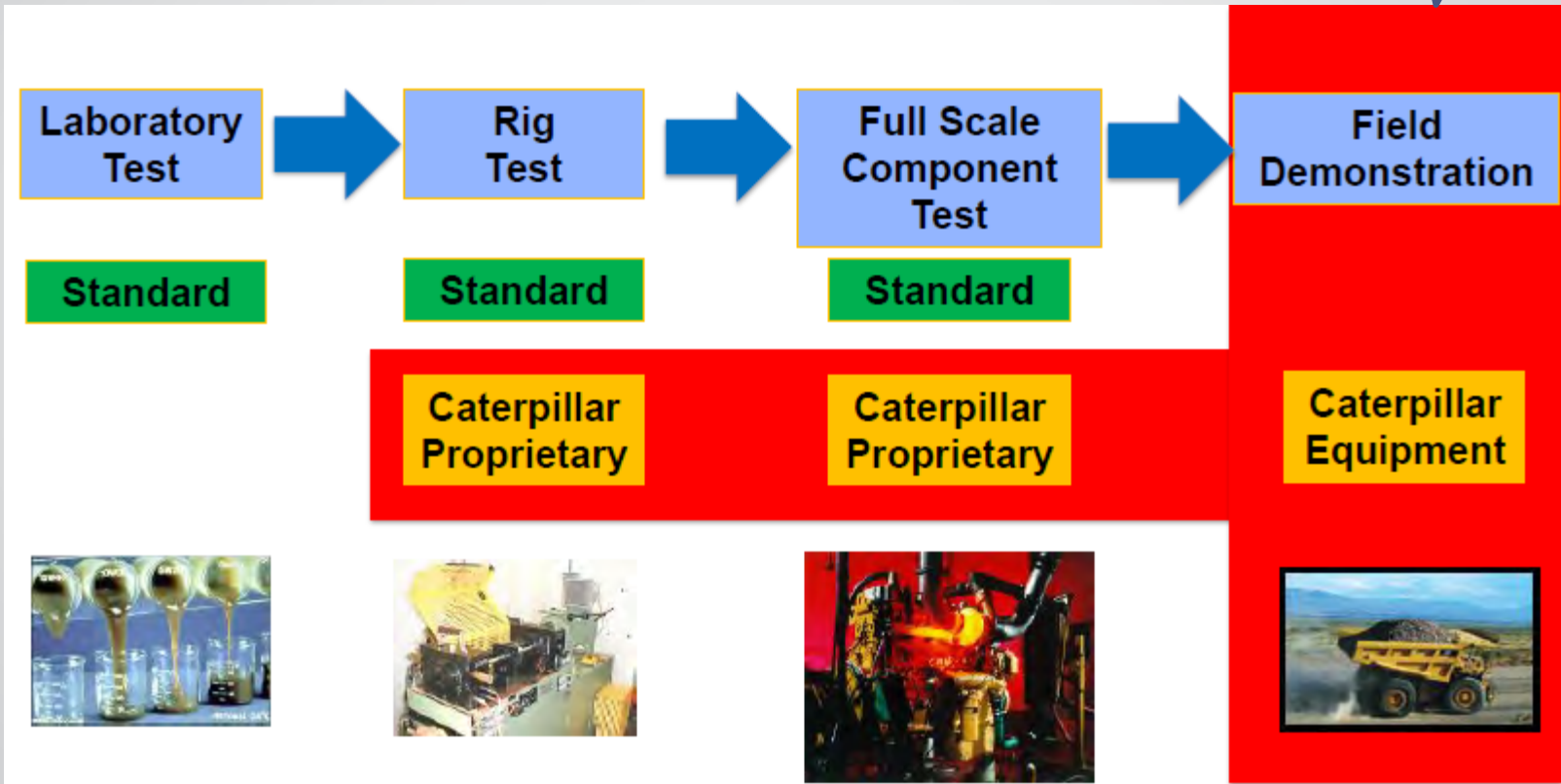
CATERPILLAR™

ExxonMobil

CATERPILLAR™

ExxonMobil

Performance Testing/ Verification



Cat DEO Testing Beyond Industry Requirements

Performance Requirements	Test	Commercial ECF-2	Cat DEO
Cat 3406E Endurance Test	Cat Proprietary		
Cat C13 ACERT Endurance Test	Cat Proprietary		
Cat 3500 Series Test	Cat Proprietary		
Cat C13 ACERT Series Wheel Loader Test	Cat Proprietary		
C13 500 Hour Engine Test			
Improved Soot-Viscosity & Shear Control			
High Temperature Shear			
Elastomer Compatibility			
Piston ring & Cylinder liner wear			
Valve train wear, sludge, oil filter plugging			
Aeration Control			
Bearing Corrosion			
Cam roller follower pin wear			
Copper, lead and tin erosion			
Foaming Control			
Viscosity Shear loss			
Viscosity Increase from soot			
Oxidation			
Piston deposits and oil control			

Fundamental Differences of Cat Oils vs Competition

- Dedicated formulation for Caterpillar
- Designed to meet Cat specifications
- Meet internal proprietary tests designed and controlled by Caterpillar (Proprietary tests not available to competitors or oil industry)
- Warranty by Caterpillar
- Providing integrated Maintenance Solutions instead of just Oil

Cat Fluid Selector

- C2C

<http://www.catfluidselector.com/>

- Cat Fluids micro website

<http://www.toromontcat.com/cat-oil/>

- Cat Filters micro website

<http://www.toromontcat.com/cat-filters/>

Selection Criteria for Fluids/ Lubricants

Price of Lubricant

Warranty
Requirements of OEM

Performance
of Lubricant

Optimization
Requirements

- Mixed fleet application
- Minimize number of used lubricants

Too often, price is the main selection criteria of the customer and only thing he/ she sees, just the tip of the iceberg.



Our job is to help customers to understand the bigger picture, encouraging them to look beneath the surface

Revealing the Iceberg



As more and more costs are revealed, price alone looks a lot less important in comparison with all the other factors

Finding the right formula

CAT DEO™	CAT DEO-ULS™	CAT DEO™ COLD WEATHER
<p>Industry-leading engine oil technology that provides exceptional engine protection and oil life. Trusted by Cat and by Cat engine customers world-wide to keep engines running at peak performance for the life of the engine.</p>	<p>The most advanced Cat engine oil technology. Compatible with the latest engine aftertreatment technology while delivering the highest level of engine protection available.</p>	<p>Similar performance as DEO-ULS, but the fully synthetic formulation keeps engine oil flowing even in the most severe cold weather conditions.</p>
<p>Use when:</p>	<p>Use when:</p>	<p>Use when:</p>
<p>Engine emissions technology in use is Tier 3 / Stage IIIA or lower.</p>	<p>Engine emissions technology in use is Tier 4 Interim / Stage IIIB or higher.</p>	<p>Temperatures on your job dip below -18° C (0° F). Suitable for use in all engine emissions tiers.</p>
	<p>Seeking a single engine oil solution for fleets containing both Tier 4 engines and engines of prior emissions tiers.</p>	
<p>Engine has no aftertreatment system or when aftertreatment does not include a Diesel Particulate Filter (DPF).</p>	<p>Engine is equipped with a Diesel Particulate Filter (DPF).</p>	
<p>Considering extended drain intervals in conjunction with Cat S•O•S Fluid Analyses.</p>	<p>Considering extended drain intervals in conjunction with Cat S•O•S Fluid Analyses.</p>	<p>Considering extended drain intervals in conjunction with Cat S•O•S Fluid Analyses.</p>

Finding the right formula

CAT TDTO™	CAT TDTO-TMS™	CAT FDAO™	CAT FDAO SYN™
Transmission and drive train oil for transmissions, wet brakes and final drives.	Multiseason transmission and drive train oil for transmissions, wet brakes and final drives.	Final drive axle oil for front wheels, differentials and final drives of off-highway trucks and final drives of large track-type tractors. FDAO allows for extended drain intervals in these systems.	A fully synthetic final drive axle oil for front wheels, differentials and final drives of off-highway trucks and final drives of large track-type tractors. FDAO SYN allows for extended drain intervals in these systems and is designed for high production applications, where uptime is critical.
Use when:	Use when:	Use when:	Use when:
Seeking up to 2,000 hours between drain intervals.	Seeking up to 2,000 hours between drain intervals.	Seeking to extend the drain interval in these systems – up to 4,000 hours of operation.	Seeking to extend the drain interval in these systems – up to 8,000 hours of operation.
Wide temperature variations are not expected on your job.	Seeking to utilize a single fluid capable of operating through wide temperature ranges, including the elimination of costly seasonal fluid changes.		Maximizing the machine production is the most important criteria.
Cat TDTO is available in a viscosity to suit your needs. Consult your Cat dealer for local recommendations.	Cat TDTO-TMS is designed to operate in transmission temperature ranges from -20° C to 43° C (-4° F to 100° F).		
The proper disposal of used oil is easy and inexpensive.	The disposal costs of used oil are high – or doing so is difficult.	The disposal costs of used oil are high – or doing so is difficult.	The disposal costs of used oil are high – or doing so is difficult.

Finding the right formula

CAT HYDO™ ADVANCED

The most advanced hydraulic oil on the market. Our exclusive additive package is unequalled in minimizing wear, reducing corrosion and eliminating water damage – all the while, providing up to three times the drain interval of standard hydraulic oils. It's a formula designed to save you time and money.

Use when:

Extending drain intervals up to 6,000 hours is valued.

Lowest total operating cost is desired.

The disposal costs of used oil are high – or doing so is difficult.

CAT MTO

Our multipurpose transmission and hydraulic oil is designed to meet the needs of your Cat hydraulic system.

Use when:

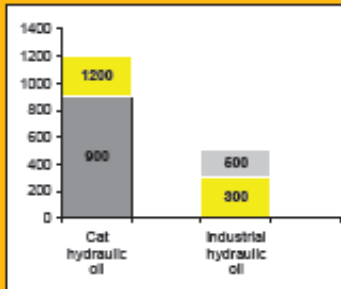
Changing hydraulic oil every 2,000 hours is acceptable.

Lowest initial purchase price is desired.

The proper disposal of used oil is easy and inexpensive.

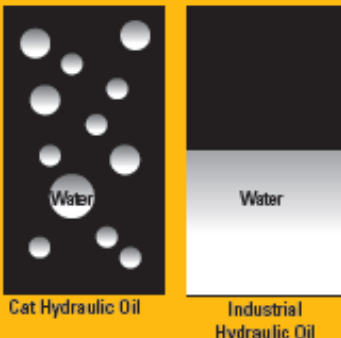
Hydraulic oil zinc additive levels

- Minimum 900 ppm zinc content... wear protection additive



Water Dispersion

- Emulsifiers are required... suspends water



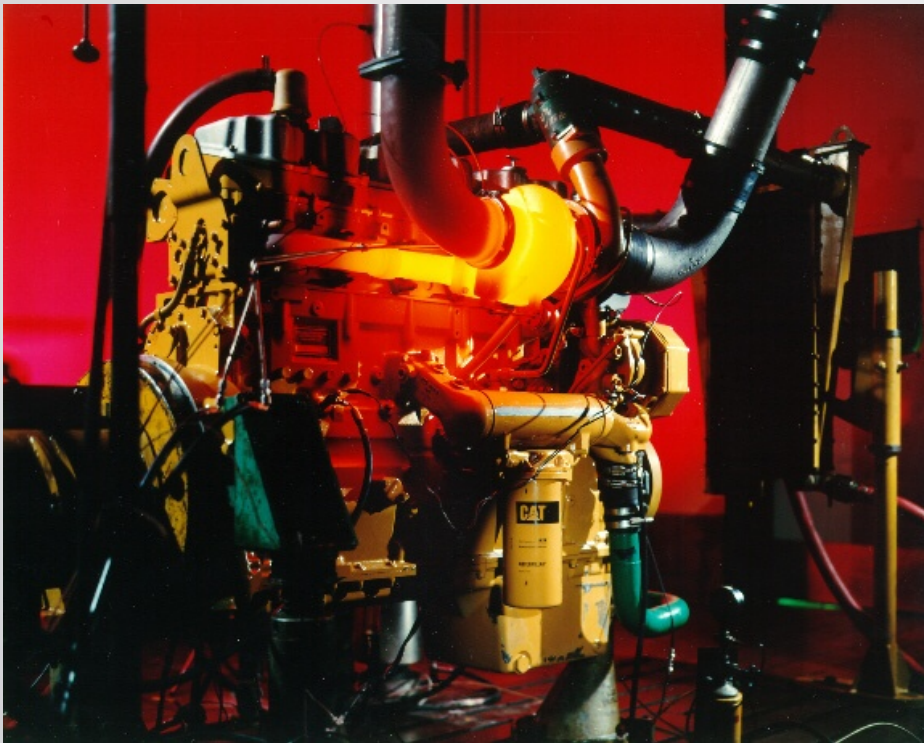
Cat[®] DEO[™] Product Line

- Cat Oils are engineered and developed for Caterpillar equipment
- Additive system...
 - Formulated by Cat and ExxonMobil for Cat[®] DEO
 - By contract, the Cat additive package cannot be sold to any other oil companies
- Base Stocks: approved by Cat only after rigorous testing
- Caterpillar performs proprietary engine testing
 - Ensures performance under the most severe conditions
 - These tests are done in addition to those required to meet ECF-1, ECF-2, API, and OEM standards



High Level of technology designed to protect Cat[®] equipment !

Tested Beyond Industry Standards

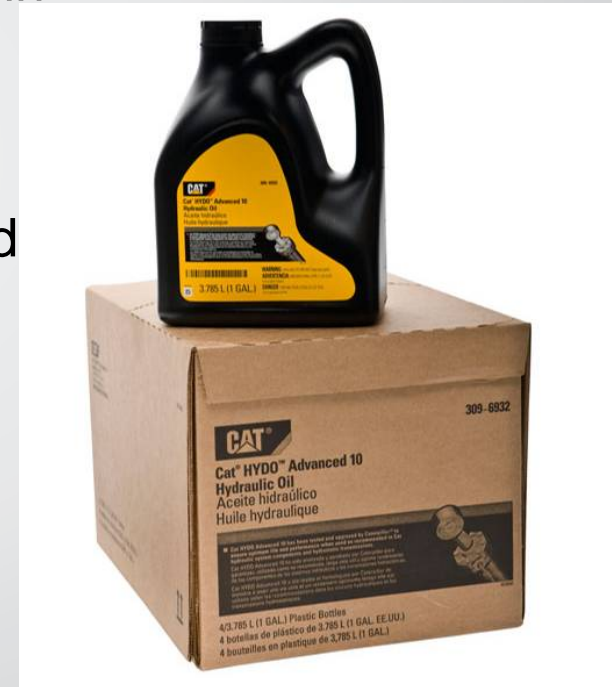


No other lubricant company has such strict standards

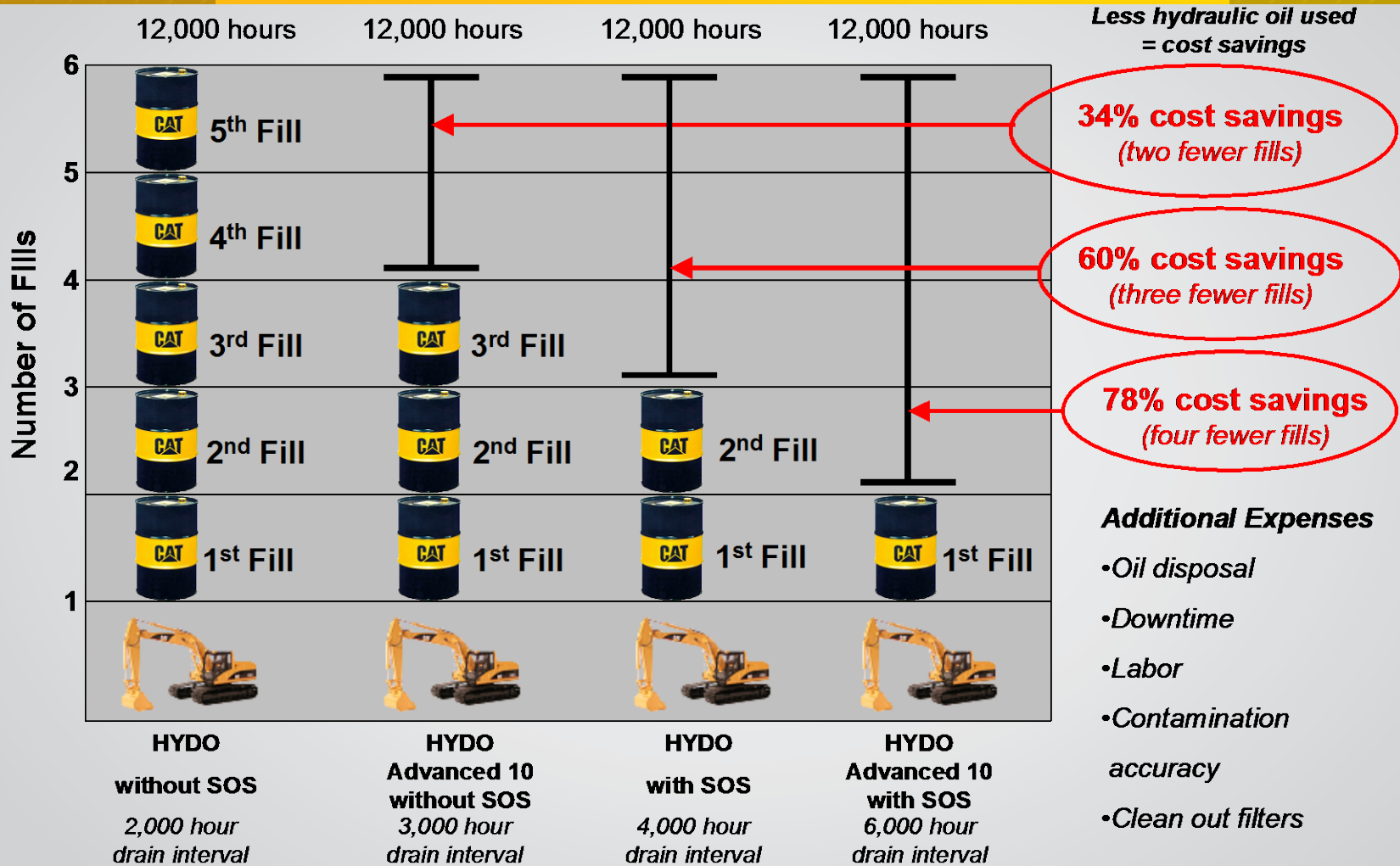
What is Cat HYDO Advanced?

Cat® HYDO™ Advanced is a completely new technology hydraulic fluid composed of:

- Unique additive components specifically for use in Cat hydraulic systems
- Specially selected and controlled higher quality base oils designed to provide longer life, extended temperature range, and overall system protection



The Benefits Add Up



SAE 10W, SAE 30, SAE 50

- System matched formula
- Longer clutch life
- Optimum wear life
- Above industry standard
- TO-4 and TO-4M specs



A product designed and tested to:

- Eliminate transmission slippage
- Increase clutch disc life by 45%
- Control brake chatter
- Increase machine break-out force
- Provide greater machine rim pull
- Improve gear wear and bearing fatigue resistance



Final Drive Axle Oil – FDAO™

SAE 60

- Developed off of TDTO
- Extended drain intervals
- Minimal foaming
- Factory fill on OHT & LTTT
- High loaded front work
- Exceeds FD-1



Cat Oil is...

- Formulated to ensure maximum equipment performance
- Developed using Caterpillar extensive expertise of Cat machines/engines
- Tested by Cat engineers in Cat equipment
- Run in actual Cat field tests to validate real world performance
- The product which provides the lowest equipment O&O costs
- Factory fill for all Cat engines, transmissions, hydraulics, final drives, ...
- Offers a consistent product and quality at a global level



Caterpillar Coolant

Over 40% of premature engine failures are due to problems in the cooling systems



Caterpillar Coolant

ELC

- Caterpillars factory-fill recommended premium product
- Reduces engine coolant and additive costs by as much as 500% compared to conventional coolants
- Longest lasting coolant product available
- Available in premixed & concentrate
- Incorporates an advanced formula technology



ELI

- Lasts three to six times longer than conventional coolants or commercial supplemental coolant additives (SCA) mixed with water. Allows for less frequent: checks of coolant health, replacement of inhibitors, and drains/flushes
- Available in concentrate
- No Glycol = No freeze protection

DEAC

- Protects the cooling system in your equipment over a temperature range of -34°F (-37°C) to 265°F (129°C) when used as a 50/50 percent mix with water
- Contains conventional coolant inhibitors providing superior protection for metal components, especially aluminum, against pitting and corrosion
- Formulation minimizes the formation of foam
- Available in concentrate



NGEC

- Protects the cooling system of your natural gas engine over a temperature range of -34°F (-37°C) to 265°F (129°C)
- Designed to prevent freezing and boiling while providing superior component protection
- Approved for use in all Cat natural gas and diesel engines
- Available in premixed

Coolant Products ELC (with glycol)

Cat ELC (with glycol)

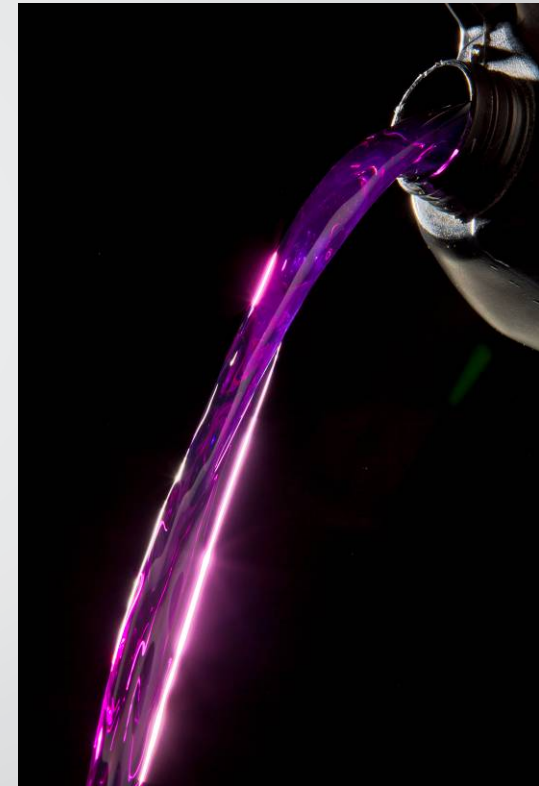
- Still the leading coolant technology in the marketplace
- 12,000 hour drain interval
- Unsurpassed corrosion and cavitation protection



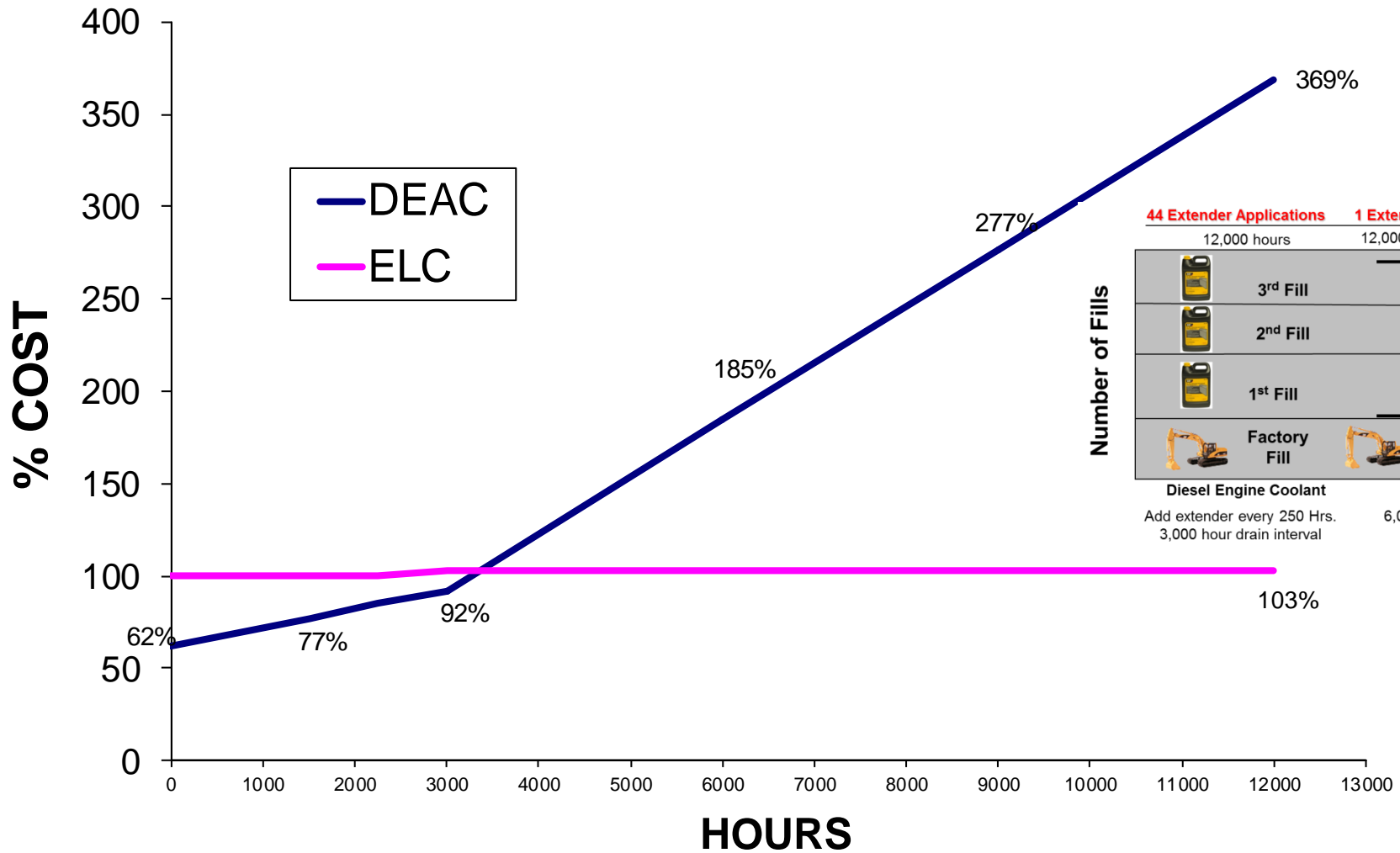
Cat DEAC

- Conventional coolant containing silicates
- Proven conventional-coolant technology that has been used successfully for decades
- But...

Carries all disadvantages of conventional coolant technology



% Cost Difference of ELC vs DEAC over 12000 Hrs



Cat Grease

- Developed & tested to meet high Caterpillar standards
- Available for all applications and climates
- Resists water, corrosion, and washout
- Reduce pin & bushing wear
- Prevents seizing



Caterpillar Greases...



Utility



Prime Application



Ball Bearing



Extreme Application



Extreme Application
- Desert



Extreme Application
- Arctic

Caterpillar Greases...

Lithium Complex Thickener



Cat Utility Grease

- NLGI 2
- General Purpose Product – where solid additives are not required
- Corrosion Protection – resists oxidation and protects metal against rust
- For low speed and low load applications where operating temperatures are between (-20°C to +140°C (-4°F to +284°F))



Cat Prime Application Grease

- NLGI 2
- Reduced Component Wear – resists softening and protects parts for optimal life
- Extreme Pressure – enhanced with 3% Moly for moderate loads
- Long life – for applications where speed, loads and temperature are moderate
- Performs and protects where operating temperatures are between -20°C to +140°C (-4°F to +284°F)



Cat Extreme Application Grease – Arctic

- NLGI 0.5
- Extreme-Cold Operation – pumps and protects where operating temperatures are between -50°C to +130° C (-58°F to +266°F)
- Extreme Pressure - 5% Moly for exceptional heavy duty performance
- Semi-synthetic base oil

Calcium Sulfonate Thickener



Cat Extreme Application Grease 1

- NLGI 1
- Extreme Pressure - 5% Moly added for extreme impact and wear resistance
- Moisture Resistance – resists washout from fresh and salt water
- Performs and protects where operating temperatures are between -20°C to +140°C (-4°F to +284°F)



Cat Extreme Application Grease 2

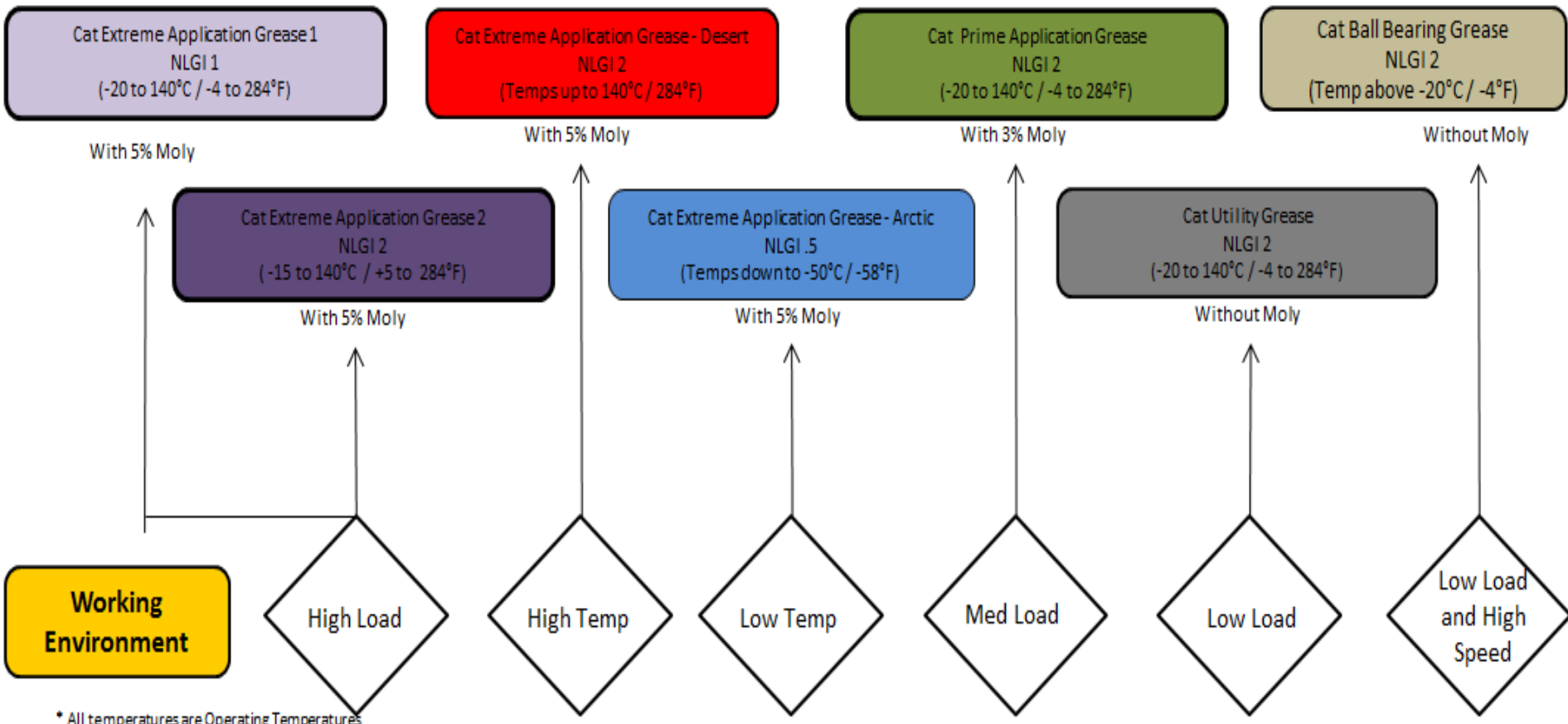
- NLGI 2
- Extreme Pressure – 5% Moly added for extreme impact and wear resistance
- Moisture Resistance – resists washout from fresh and salt water
- Performs and protects where operating temperatures are between -15°C to +140°C (+5°F to +284°F)



Cat Extreme Application Grease – Desert

- NLGI 2
- Extreme-Heat Operation – performs and protects where operating temperatures are between -10°C to +140°C (+14°F to +284°F)
- Extreme Pressure - 5% Moly for exceptional heavy duty performance
- Mineral base oil

Grease Selection Guide



Caterpillar Greases

- Formulated for Caterpillar equipment
- Greases for all applications and climates
- Variety of packaging options



Thanks

Common Acronyms

- MERV = Minimum Efficiency Reporting Value
- DEO = Diesel Engine Oil
- ULS = Ultra Low Sulphur
- TDTO = Transmission and Drive Train Oil
- FDAO = Front Drive / Axle Oil
- UHE = Ultra High Efficiency
- NGEO = Natural Gas Engine Oil
- MTO = Multipurpose Tractor Oil
- ELC = Extended Life Coolant
- ELI = Extended Life Inhibitor
- DEAC = Diesel Engine Antifreeze Coolant
- NGEC = Natural Gas Engine Coolant
- HYDO = Hydraulic Oil
- ECF = Engine Crankcase Fluid
- SAE = Society of Automotive Engineers
- OHT = Off Highway Truck
- LTTT = Large Track Type Tractor