

# Cat® DEO-ULS™

API CK-4 Engine Oil

SAE 15W-40 and 10W-30



## Designed to offer optimal protection and performance in heavy duty engines

Cat® DEO-ULS™ is uniquely formulated and optimized to provide the highest level of protection and performance in a wide variety of engine applications, including those requiring aftertreatment systems.

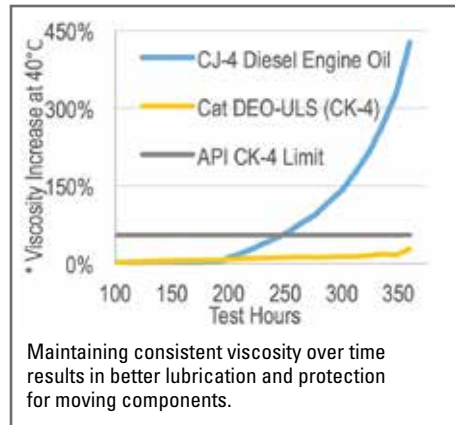
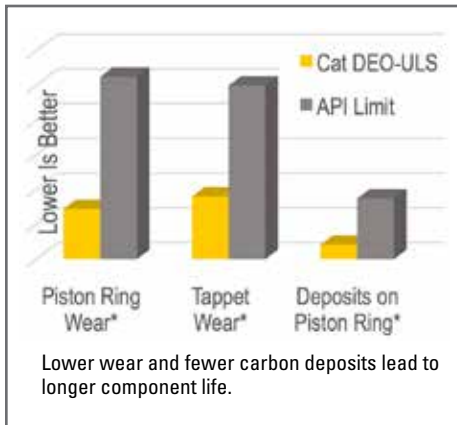
### Cat-DEO-ULS:

- Exceeds the performance requirements of API CK-4
- Is backwards compatible with prior API oil categories
- Provides optimal performance, durability and engine life
- Can be used in all engines requiring API CK-4 or prior API category of diesel engine oil (consult your OMM)

Benefits	
Minimized Engine Deposits	Improved oxidation and thermal stability minimizes engine deposits and provides consistent protection throughout the oil drain interval.
Reduced Aeration	Reduced aeration results in improved protection against oil breakdown, cavitation and corrosion.
Improved Shear Properties	Improved shear properties allow the oil to maintain a consistent viscosity under high loads, providing better lubrication and protection for moving components.
Longer Protection	Specially designed additives and superior base stock deliver optimal engine protection and durability while supporting consistent emissions performance.



## Cat DEO-ULS Outperforms API CK-4 Requirements



\* Industry Standard Testing: Piston Ring Wear-Mack T12 Test, Tappet Wear-Cummins ISB Test, Deposits on Piston Ring-Caterpillar C13 Test, Viscosity Increase-Volvo T13 Test

**API Diesel Engines Categories**  
API CK-4, CJ-4, CI-4, CI-4 PLUS, and CH-4.

**Exceeds OEM Performance levels of:**  
Cat ECF-3, ECF-2 and ECF-1A

May be used for:  
ACEA E9  
Detroit Diesel DFS 93K222  
Cummins CES 20086  
Volvo Mack VDS STD 417-003

Typical Characteristics*		
SAE Viscosity Grade	15W-40	10W-30
Flash Point, °C (ASTM D92)	225	218
Pour Point, °C (ASTM D97)	-33	-36
Viscosity		
cSt @40° C (ASTM D445)	109	82
cSt @100° C (ASTM D445)	14.1	12.0
HTHS @ 150° C, cP (ASTM 4683)	4.1	3.6
Viscosity Index	130	142
Phosphorous, % wt. (ASTM D4951)	0.10	0.10
Sulfur, % wt. (ASTM D2622)	0.24	0.24
Zinc, % wt. (ASTM D4951)	0.12	0.12
Sulfated Ash, % wt. (ASTM D874)	0.90	0.90
Volatility (ASTM D5800)	9.5	11.30
TBN (ASTM D4793)	8.6	8.7
Density @ 15.6 °C (ASTM D4052)	0.875	0.868

\*The values shown are typical values and should not be used as quality control parameters to either accept or reject product. Specifications are subject to change without notice.

### Applications

- Cat oils are formulated to provide optimal performance and engine protection for all Caterpillar engines and up to 3500\* engine models operating under all conditions and severity and in all applications
- Ideal for mixed fleets and for on-highway heavy duty trucks
  - o Tier 4 (US)
  - o Stage IIIB/IV (EU)
  - o 2007/2010 on-highway exhaust emissions standards (US)
  - o Japan 2014
- Backwards compatible with prior API categories: API CJ-4, CI-4, CI-4 PLUS, and CH-4

\* Oil recommendations for 3116 and 3126 MUI Marine and MaK™ diesel engines can be found in the Operation and Maintenance Manual (OMM).

### Health and Safety

For information on proper use for health, safety, and environment, please refer to the Material Safety Data Sheet (MSDS). Read and understand the MSDS before using this product. Always observe good hygiene measures. For a copy of the MSDS, contact us or visit the web at [www.catmsds.com](http://www.catmsds.com).

## CAT DEALERS DEFINE WORLD-CLASS PRODUCT SUPPORT.

We offer you the right parts and service solutions, when and where you need them.

The Cat Dealer network of highly trained experts can help you maximize your equipment investment.

## BUILT FOR IT.™



# Cat® GO

Gear oil for Cat manual transmissions, differentials and final drives.

SAE 80W-90, SAE 85W-140



## Recommended Use

Cat GO is a multi-grade API GL-5 classification gear oil intended for extreme-pressure applications, such as the following:

- **Differentials and final drives** on Cat Wheel Tractor-Scrapers, specific Articulated Trucks, Wheel Excavators, and Backhoe Loaders
- **Cold Planer** direct drive transmissions, differentials and final drives
- **Drum bearings** on Vibratory Soil Compactor

## Discover the Difference

Cat GO is tested and approved by Caterpillar to meet the same high standards as Genuine Cat Parts.

- **Longer Gear and Bearing Life**—Superior thermal stability and oxidation resistance reduce deposits and wear.
- **Extreme-Pressure Performance**—Provides extra protection for improved performance and life in extreme-load conditions.
- **Simplified Maintenance**—Multi-purpose capability reduces number of gear lubricants needed for maintenance.
- **Wide Temperature Range**—Provides excellent stability at high temperatures and superior performance at low temperatures for easier start-ups.



## Typical Characteristics\*

SAE Viscosity Grade	80W-90	85W-140
Gravity, API (ASTM D287)	26.6	25.1
Flash Point, °C (°F) (ASTM D92)	174 (345)	226 (439)
Pour Point, °C (°F) (ASTM D97)	-27 (-17)	-24
(0) Viscosity		
cP @ -26° C (ASTM D2983)	107,000	75,200
cSt @ 40° C (ASTM D445)	130	337
cSt @ 100° C (ASTM D445)	14.5	27.4
Viscosity Index (ASTM D2270)	110	98
Phosphorus, % wt. (ASTM D1091)	0.88	0.88
Density @ 16° C	0.897	0.910

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## S•O•S<sup>SM</sup> Services for early problem detection

Protect your investment with Cat S•O•S oil analysis, the ultimate detection and diagnostic tool for your equipment. S•O•S helps you detect potential problems before they can lead to major failures and costly, unscheduled downtime.

## Cat Filters: Complete protection for your machine

Combine Cat Fluids with Cat Filters for the highest level of contamination control and protection for your machine. We recommend Cat Filters for all Cat machine applications.

## Health and Safety

Under normal conditions of intended use, this product does not pose a risk to health. Excessive exposure may result in eye, skin or respiratory irritation. Always observe good hygiene measures. Read and understand the Material Safety Data Sheet (MSDS) before using this product. For a copy of the MSDS, visit us on the web at [www.catmsds.com](http://www.catmsds.com).

## CAT DEALERS DEFINE WORLD-CLASS PRODUCT SUPPORT.

We offer you the right parts and service solutions, when and where you need them.

The Cat Dealer network of highly trained experts keeps your entire fleet up and running to maximize your equipment investment.

## BUILT FOR IT.™



# THE CAT® SYSTEM SOLUTION

DESIGNED TO PROTECT YOUR EQUIPMENT

You invested in top-quality Cat® equipment. Why choose low-quality maintenance parts that wear down its components? For more than 30 years, Caterpillar has been optimizing the three aspects critical to machine health: filters, fluids and S-O-S™ Fluid Analysis, together leading to longer-lasting components and the lowest owning and operating costs. **We call this the Cat System Solution.**

“ I've seen large machines that have 60,000 hours and still operating 24/7. It's just amazing to me how well they are protected when they use our systems.”

Hind Abi-Akar, Product Specialist



## THE SYSTEM SOLUTION DIFFERENCE

Fluids are the lifeblood of your equipment, so using the right Cat fluid is step one in maximizing system health. Cat filters are step two, ensuring that your system stays cleaner longer. The final element is Cat S-O-S Fluid Analysis, a routine check-up for your oil, coolant and equipment.

With the Cat System Solution, you can extend drain intervals, avoid costly failures by preventing and identifying contaminants early and ultimately help your equipment thrive.

### CAT® SYSTEM SOLUTION



#### CAT FLUIDS

Lubricate critical components, protecting system performance



#### CAT FILTERS

Capture harmful particles & maintain system cleanliness



#### S-O-S™ FLUID ANALYSIS

Provides data & insight into fluid & equipment health



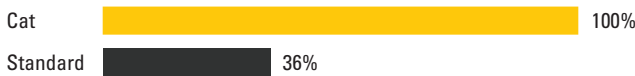
# THE PROOF OF THE SYSTEM SOLUTION

When you invest in top-quality products, the results show. Here's how Cat filters and fluids, when paired with S-O-S Fluid Analysis, perform in the field.

## CAT FUEL FILTERS

Testing has shown using anything other than a Cat fuel filter compromises and shortens injector life.

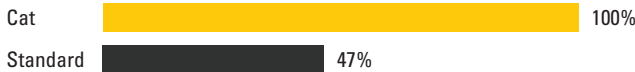
### Longer Injector Life



## CAT AIR FILTERS

Cat Ultra-High Efficiency (UHE) filters provide superior protection and extended piston ring life, outperforming other standard filter brands.

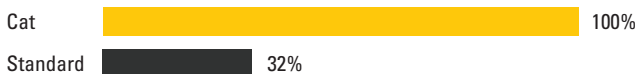
### Longer Piston Ring Life



## CAT FLUIDS

Cat Diesel Engine Oil (DEO) exceeds industry requirements, protecting your engine from expensive wear.

### Protection Against Engine Wear\*



\*Based on Mack T12, Cummins ISB & Cummins ISM industry standard wear tests

## SAVINGS FROM THE JOB SITE

One Cat oil and gas customer used to service their fleet of 210 Prime Gensets with an industry standard engine oil and a blend of filter brands. They switched to the Cat System Solution, introducing Cat filters, Cat Diesel Engine Oil (DEO) and regular S-O-S Fluid Analysis. With all components working in lockstep, the savings stacked up.



**DECREASED OIL CONSUMPTION BY MORE THAN 50%**



**EXTENDED OIL DRAIN INTERVALS BY 2.5X**



**SAVED \$130,000 ON FILTERS AND FLUIDS ANNUALLY**



## DON'T GO IT ALONE

The Cat dealer network provides the parts and service solutions you need to keep your whole system — and fleet — operating at optimal levels. For hassle-free machine ownership, ask your dealer about a Customer Value Agreement (CVA). It's a simple way to get Cat filters, fluids and S-O-S Fluid Analysis in one easy plan.

TAKE A CLOSER LOOK at [Cat.com/filtersandfluids](https://www.cat.com/filtersandfluids)

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# TRUE CONFIDENCE COMES FROM WITHIN WITH CAT® HYDO™ ADVANCED

Cat® HYDO™ Advanced offers a significant performance breakthrough in hydraulic oil technology.

## 6,000-HOUR DRAIN INTERVALS AND EXTRA SYSTEM PROTECTION.

Cat HYDO Advanced monitored with S•O•S<sup>SM</sup> Services can streamline your operation.

- Cat<sup>®</sup> HYDO<sup>™</sup> Advanced is a heavy-duty, long-life hydraulic oil.
- With a combination of premium additives and specially selected and controlled higher-quality base oils, Cat HYDO Advanced extends drain intervals and provides extra protection to hydraulic system components.
- Increase productivity and lower your owning and operating costs with longer drain intervals. Plus get long-lasting anti-wear and corrosion protection in a wide operating temperature range.



Developed, tested and approved by Caterpillar<sup>®</sup> to meet the same high standards as all Genuine Cat Parts, Cat HYDO Advanced is a significant step forward in hydraulic oil technology. It will help you minimize maintenance time, get greater productivity and lower your costs.

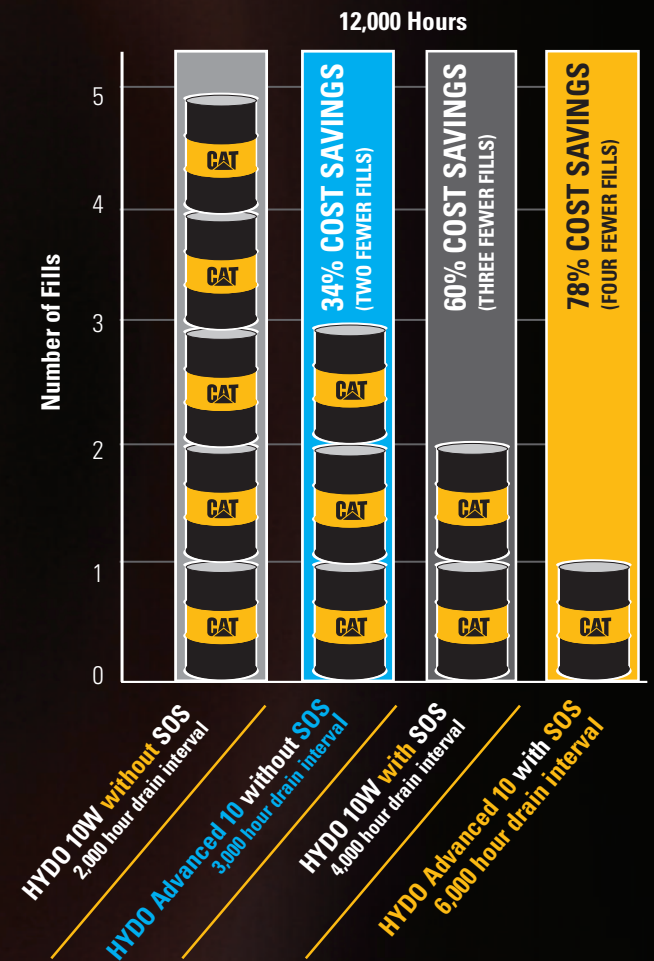




## THE BENEFITS ADD UP.

- **6,000-HOUR EXTENDED DRAIN INTERVALS** – up to triple the hours of Cat HYDO 10W when monitored with Caterpillar S•O•S<sup>SM</sup> Services oil analysis program every 500 hours. Reduces owning and operating costs and increases uptime.

## LESS HYDRAULIC OIL USED = COST SAVINGS



\* Additional Savings = Oil Disposal • Downtime • Labor • Contamination Accuracy • Filter Clean-out

- **Enhanced, long-lasting anti-wear protection** – specially developed additives form a protective layer on the wear surfaces, reducing component wear in high-pressure piston, vane and gear hydraulic pumps.

- **Holds water in dispersion** – contains emulsifiers specifically designed to disperse water. Caterpillar does not recommend oils that “separate,” “shed” or “release” water. Separated water drawn through the hydraulic system can damage pumps and other components. If this water freezes, it can cause serious damage.

- **Backward compatibility** – the only hydraulic oil you need to stock for your maintenance operations. Preferred fill for Cat equipment.

- **Improved filtration properties** – special detergent and dispersants keep components clean and improve transport of contaminants through the filters. Compatible with Cat<sup>®</sup> Ultra High Efficiency filters.

- **Improved corrosion protection** – protects metal surfaces from rust. Better corrosion protection than most oils in the Cat line-up.

- **Fast air release** – rapid air separation reduces air release time, preventing cavitation. Cat HYDO Advanced 10 air release time of less than 4 minutes is far superior compared to Cat HYDO 10W at 7-10 minutes air release time (per ASTM D3427 testing).

- **Wide temperature range protection** – maintains consistent wear protection at both cold and hot temperatures. Designed to flow readily at cold-temperature startup and maintains excellent wear protection at operating temperatures.

- **Improved oil stability** – 250% increase in oxidation stability (per ASTM D943). Improved oil stability and wear protection make Cat HYDO Advanced last longer.

# HEAD-TO-HEAD COMPARISON

Cat HYDO Advanced 10 vs. other hydraulic oils

CHARACTERISTIC <sup>1</sup>	Cat HYDO Advanced 10	Typical Diesel Engine Oil API CF SAE 10W	Typical Premium Industrial Hydraulic Oil, HVLP or HV	Cat HYDO Advanced 10 Advantages
<b>SAE Viscosity Grade</b>	10W	10W	Varies	Better wear protection, wider operating temperature range
<b>Viscosity</b> <i>cSt @ 40°C (ASTM D445)</i>	42.0	40	46	
<i>cSt @ 100°C (ASTM D445)</i>	6.7	6.3	8.0	
<i>Viscosity Index (ASTM D2270)</i>	114	105	146	
<b>Viscosity after Shear<sup>2</sup></b> <i>cSt, during use</i>	6.7	6.5	6.6	
<b>FZG Gear Test DIN 51534, Fail Stage<sup>3</sup></b>	12	12	11	
<b>35VQ25 Vickers Total Wear Test</b>	33mg	40 –90 mg	< 90mg	
<b>Pour Point</b> <i>°C, ASTM D 97</i>	-39	-30	-36	Corrosion protection
<b>Zinc</b> <i>% wt., ASTM D 4951, Typical</i>	0.090	Varies	< 0.040	
<b>Copper Strip Corrosion<sup>4</sup></b> <i>3 hr, ASTM D130</i>	1A at 150° C	1 at 100° C	1 at 100° C	
<b>Rust Protection<sup>5</sup></b> <i>ASTM D 665B</i>	Pass	Varies	Varies	
<b>Oxidation Stability, Hours</b> <i>ASTM D943</i>	> 5,000 hrs	> 2,000 hrs	> 2,000 hrs	
<b>Long Drain Interval Confirmed by Field Testing</b>	Yes	No	No	
<b>Filterability</b> <i>Wet, E DIN ISO 13357-1</i>	Pass	Fail	Pass	Filter bypass; filter plugging; contamination control
<b>Air Release</b> <i>Air Release @ 50° C (ASTM D3427)</i> <i>Lower is better</i>	4 min	7 –10 min	7 –13 min	Better air release reduces cavitation damage
<b>Cleanliness</b>	No interference with optical particle counters	Interference with optical particle counters	Varies	Accurate contamination control
<b>Ability to keep water in emulsion</b>	Yes	Yes	No	Sludge control and water damage prevention



## DESTRUCTIVE PUMP TEST Cat HYDO Advanced 10 vs. Cat HYDO 10W

Cat HYDO Advanced 10 is the best product for Cat machine hydraulic systems. Tested side by side under severe wear application conditions, simulated with Cat's proprietary destructive piston pump test, Cat HYDO Advanced 10 clearly outperformed HYDO 10W. Proof of performance? Significantly less visible wear. With Cat HYDO Advanced 10, the piston pump is in excellent condition after 200 hours. The piston pump with HYDO 10W failed after 178 hours.

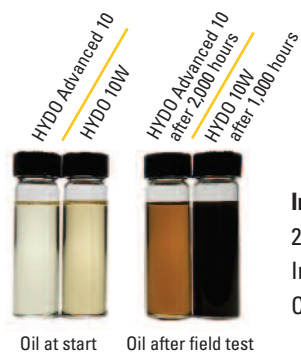
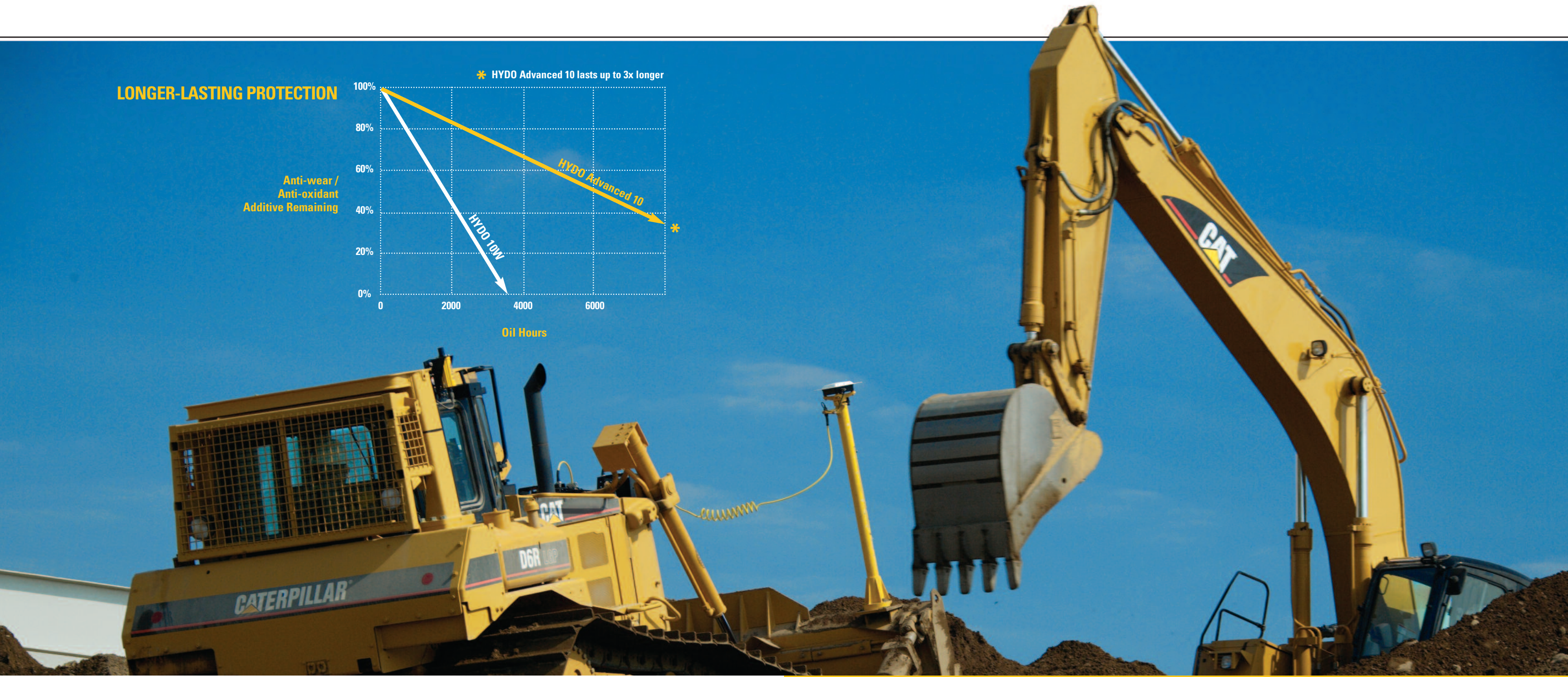
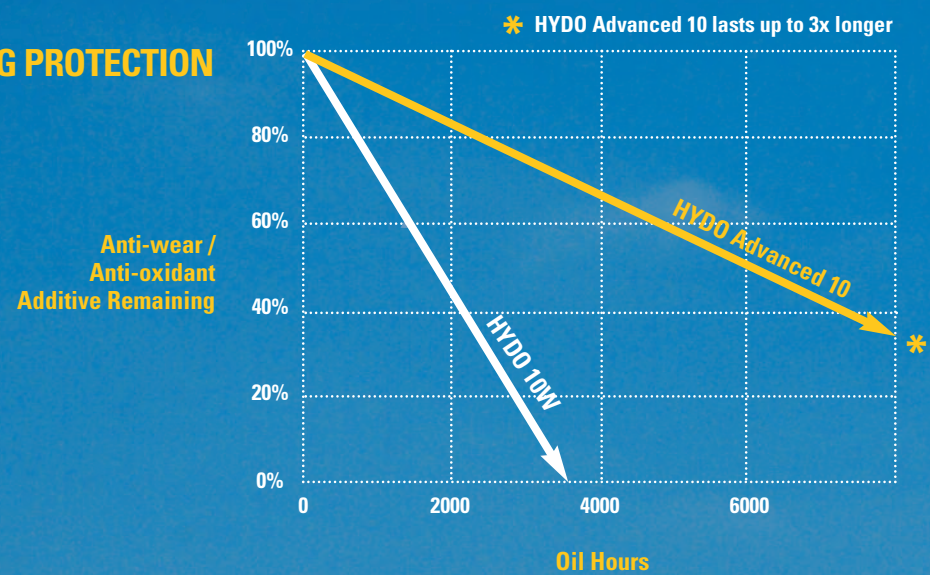
<sup>1</sup> The values shown are typical values and should not be used as quality control parameters to either accept or reject product. Specifications are subject to change without notice.  
<sup>2</sup> Oils that contain viscosity modifier additives will become thinner during use in this machine. This will reduce protection level.  
<sup>3</sup> Higher is typically better but too-active antiwear additives may lead to reduced component life.  
<sup>4</sup> 1A is better than 1B, 1A at 150° C is better than 1A at 100° C.  
<sup>5</sup> May be difficult to pass with 10W engine oils.

6,000-11,000  
EXTENDED DRAIN INTERVALS



CAT HYDO  
ADVANCED

## LONGER-LASTING PROTECTION



### Improved Oil Stability

250% increase in oxidation stability (per ASTM D943). Improved oil stability and wear protection make Cat HYDO Advanced last longer.

## FIELD TESTS

Cat HYDO Advanced 10 has been subjected to severe qualification testing in the field and laboratory for thousands of hours. Caterpillar field-tested Cat HYDO Advanced 10 in 43 machines over a three-year period in order to perform a thorough performance validation.

**The results:** Cat HYDO Advanced 10 demonstrated clear real-world anti-wear and

oxidation stability performance improvements over Cat HYDO 10W, lasting up to 9,000 hours in certain applications. In fact, in severe applications, where frequent oil changes were often standard practice, oil life doubled and component wear rates were cut in half. S•O•S Services oil analysis test results confirmed a dramatic reduction of wear-metal particles.

After 2,000 hours of severe field testing in excavators, Cat HYDO Advanced showed clear performance improvements over Cat HYDO 10W with 80% of HYDO Advanced's anti-wear/anti-oxidant additive remaining, compared to 40% for HYDO 10W. At 4,000 hours, HYDO Advanced still showed more than 60% remaining, while HYDO 10W's additive was completely depleted.

## A COMPREHENSIVE CONTAMINATION CONTROL PROGRAM DELIVERS BIG BENEFITS.

Entrusting your repair and maintenance needs to your Cat® Dealer can pay big dividends. Your Cat Dealer's investment in contamination control training, practices, processes and equipment has the potential

to maximize component life and improve uptime while lowering your owning and operating costs.

**Ask your Cat Dealer about the contamination control programs available to you.**



**\* EXAMPLE:** A common contamination control practice called "kidney looping" – a process pioneered by Caterpillar – can clean a machine's hydraulic system oil back to its targeted cleanliness level, increasing component life, extending fluid and filter service life and reducing the overall cost of oil disposal.



## CAT S•O•S<sup>SM</sup> SERVICES MAKE A REAL DIFFERENCE.

All oil analysis is not the same.

There is one clear choice when selecting an oil analysis service – Cat S•O•S Services. While oil companies or independent labs may claim they can analyze used oil from Caterpillar machines or engines, only Caterpillar knows exactly what metallurgical specifications were designed into each part and component.

Oil analysis is similar to medicine. At the end of the day, you want the best recommendations and treatment available, not just the test results. S•O•S Services reports contain a color-coded Alert Level and a detailed recommendation, as well as test results. The Alert Level lets you know, at a glance, the condition of your equipment,

while the recommendation provides an explanation of the test results and a course of action. If a problem is detected, the S•O•S Services report will provide machine-specific areas to inspect.

**Contact your Cat Dealer for more information.**



## SUSTAINABILITY IS BUILT IN.

Cat HYDO Advanced is designed to allow for longer oil change intervals, which means less oil is used. In fact, a 6,000-hour oil drain interval is possible when using Cat HYDO Advanced, Cat oil filters and S•O•S Services oil analysis.



## HEALTH AND SAFETY

Under normal conditions of intended use, this product does not pose a risk to health. Excessive exposure may result in eye, skin or respiratory irritation. Always observe good hygiene measures. Read and understand the Material Safety Data Sheet (MSDS) before using this product. For a copy of the MSDS, visit us online at [www.catmsds.com](http://www.catmsds.com)

**Cat® HYDO Advanced**

To find out more, see your Cat Dealer.