



# **Coffee with Carson October 2023**

## **Valvoline Heavy Duty Lubrication Discussion**

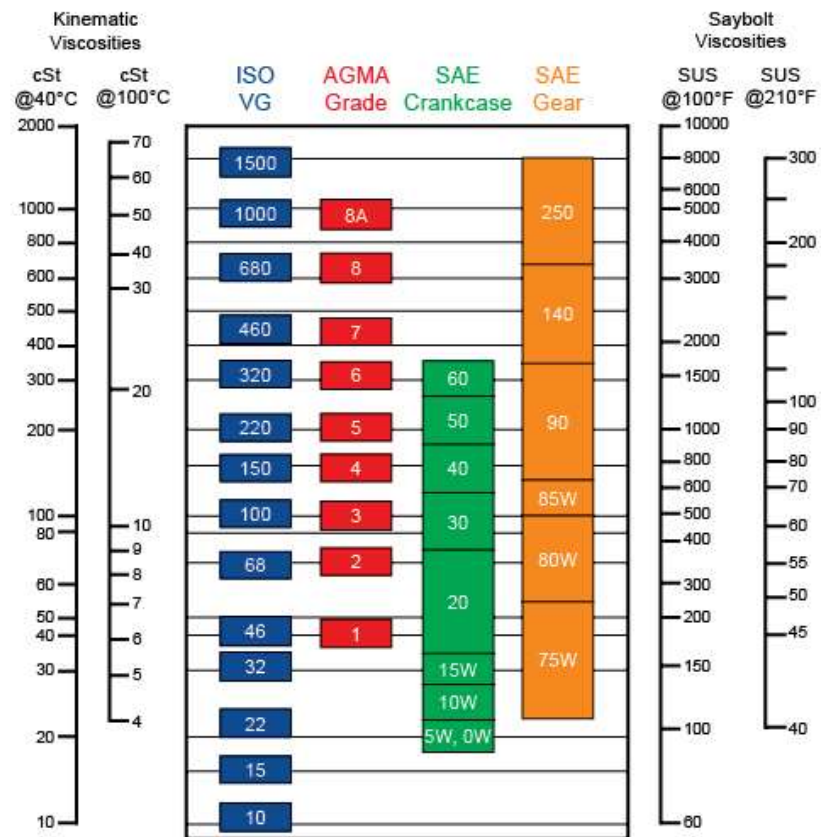
## Your Presenters

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- Greg Batten, Valvoline Heavy Duty Business Manager, (HDBM)
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# Viscosity Chart



## Viscosity Grading Systems





## Viscosity Chart Summary

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- > Same Viscosity, different names
- > Additive packages matter for the long term
- > Small numbers can mean big differences


**Product Finder**


Contact Us  Sign in 


Product Finder


Search for a Usage Application to Receive Valvoline Product Recommendations.


OR


 Cars, SUVs and Light Duty Trucks


 Heavy Duty Trucks and Buses

 Agriculture

 Construction and Mining

 Motorcycles, ATVs, and Snowmobiles

 Classic Car

 Leisure Marine


2018

Caterpillar

Wheeled excavato...

224B

APPLY




**Valvoline Wipers & Filters**  
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Please always review the vehicle's user manual prior to installing Valvoline Products. Valvoline and third-party data are used to determine vehicle product recommendations.  
[Please click here to review Valvoline's policy regarding use of third-party data.](#)

# A list of recommended products

 **Valvoline**

Normal use:  
Change 2000 hours/12 months

Valvoline ZereX 1000  
Constant


Valvoline ZereX Heavy Duty  
Extended Life Constant

Valvoline ZereX Heavy Duty  
Extended Life Variable Torque  
Constant

Valvoline ZereX 1000  
Charged Constant

**Differential, steered axle**  
Capacity Capacity 1.1 US quarts/ 10.5 L


Normal use:  
Check 1000 hours/Change 1000 hours



Valvoline SPM Full  
Synthetic SAE 75W-90 Gear  
Oil

**Hub reductions**  
Capacity Capacity 2.4 US quarts (each half) 2.5 L


Normal use:  
Change 1000 hours/12 months



Valvoline SPM Full  
Synthetic SAE 75W-90 Gear  
Oil

**Transaxle**  
Capacity Capacity 1.4 US quarts/ 13.5 L



Normal use:  
Change 1000 hours/12 months



Valvoline SPM Full  
Synthetic SAE 75W-90 Gear  
Oil

**Hydraulic system**  
Capacity Capacity 4.1 US quarts/ 389.5 L

Normal use:  
Change 2000 hours/12 months


 

Valvoline Ultra Trac 320  
10W Transmucor Oil

Valvoline All-Season Plus 680  
50 Wiggins Oil

**Grease points**

Normal use:



## Dash.Valvoline.Com - Summary

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- > Use DASH for product recommendations
- > Consolidate products by using DASH



HEAVY  
DUTY

## A COMPLETE PRODUCT LINE ENGINEERED FOR EXCEPTIONAL PERFORMANCE.



Engine Oils



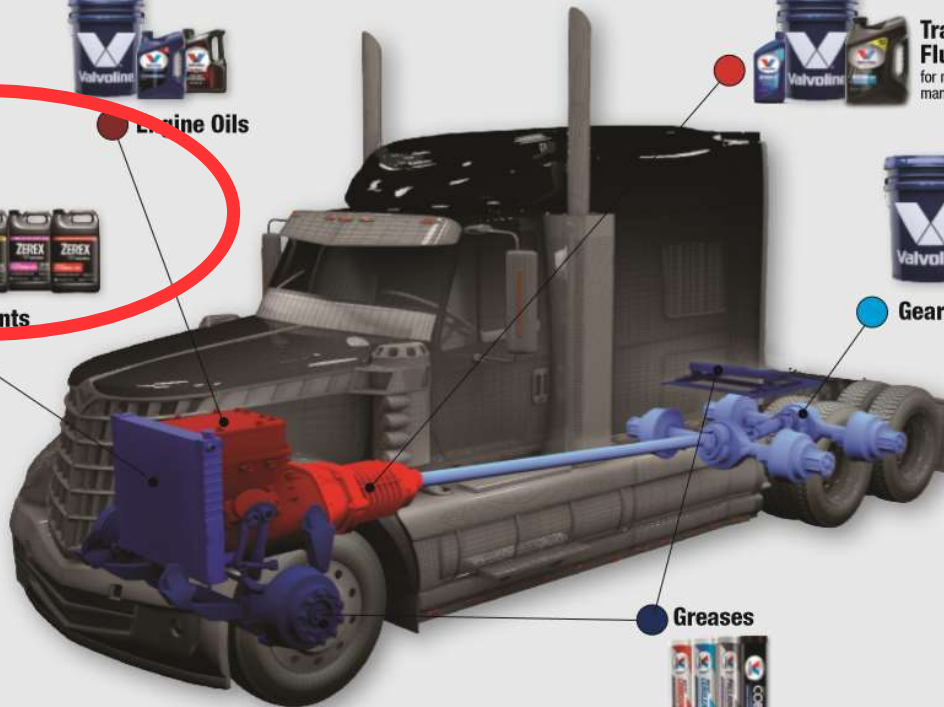
Transmission  
Fluids  
for manual, automated  
manual & automatic



Coolants



Gear Oils



Greases



TRUSTED FOR 150 YEARS

ENGINE OILS

COOLANTS

GREASES



# ZEREX™ HEAVY-DUTY APPLICATION CHART

ZEREX <sup>™</sup> Valvoline PRE-CHARGED		ZEREX <sup>™</sup> Valvoline FULLY FORMULATED		ZEREX <sup>™</sup> Valvoline G05		ZEREX <sup>™</sup> Valvoline EXTENDED LIFE		ZEREX <sup>™</sup> Valvoline NITRITE FREE	
<b>ZEREX<sup>™</sup> Pre-Charged</b> 3 Year 3,000 Hours 150,000 Miles  • Ethylene glycol (EG) • Low-sulfate		<b>ZEREX<sup>™</sup> Fully Formulated</b> 3 Year 3,000 Hours 150,000 Miles  • Ethylene glycol (EG) • Low-sulfate		<b>ZEREX<sup>™</sup> G05</b> 3 Year 7,000 Hours 300,000 Miles  • Ethylene glycol (EG) • Low-sulfate		<b>ZEREX<sup>™</sup> Extended Life</b> 3 Year 7,000 Hours 300,000 Miles  • Ethylene glycol (EG) • Low-sulfate • Phosphate-free		<b>ZEREX<sup>™</sup> Nitrite Free</b> 6 Year 12,000 Hours 600,000 Miles  • Ethylene glycol (EG) • Nitrite Free • Phosphate-free	
<b>MANUFACTURER SPECIFICATIONS</b> ZEREX meets or exceeds the following manufacturer specifications:									
Cummins	Diesel Engines	Diesel Engines	CES 14803* CES 14439	CES 14603*, CES 3666286, CES 14439	CES 14603* CES 14038				
Caterpillar	Diesel Engine	Diesel Engines	EC-1	EC-1	EC-1				
Detroit Diesel	Diesel Engine	Diesel Engines	7SE298	7SE298	DFS93K217ELC				
Navistar	MPAPS I	MPAPS B-1 II	MPAPS B-1 III	MPAPS B-1 III	MPAPS B-1 IIIA				
<b>OTHER APPLICATIONS</b> ZEREX meets or exceeds the specifications for use in the following equipment:									
FREIGHTLINER	FREIGHTLINER	JOHN DEERE*	MACK	FREIGHTLINER					
MACK	MACK	MERCEDES-BENZ*	LINK BELT	JOHN DEERE					
PACCAR	PACCAR	MTU/DCC*	JOHN DEERE	MACK					
		MACK	VOLVO	VOLVO					
		PACCAR	PACCAR	MERCEDES-BENZ					
				PACCAR					
<b>OTHER SPECIFICATIONS</b> ZEREX meets or exceeds the following industry specifications:									
ASTM	D3306, D6210	D3306, D6210	D3306, D6210	D3306, D6210	D3306, D6210				
TMC RP	302A, 302B, 329B	302A, 302B, 329B	302B, 329B	329B, 338	329				
Federal Specification	A-A-870A, A-A-52824	A-A-870A, A-A-52824	A-A-870A	A-A-870A	A-A-870A				

## Zerex Nitrite Free AF/Coolant

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- > Compatible : Can be mixed with other coolants.

## Zerex Nitrite Free AF/Coolant

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- > Compatible : Can be mixed with other coolants.
- > Durable: 1 Million Miles, 10 Years, 20,000 Hours



AMERICAN OWNED & OPERATED

ZEREX™ BY VALVOLINE™



## ZEREX HD NITRITE FREE RED ELC

FEATURES & BENEFITS:

### COMPATIBLE WITH A WIDE VARIETY OF APPLICATIONS

ZEREX™ is the leader in coolant technology and has more OE approvals than other leading brands. Our modern formulation makes ZEREX HD Nitrite Free RED ELC one of the most dynamic antifreezes on the market, with backwards compatibility for all cooling systems requiring OAT chemistry.

#### APPROVAL:

Cummins CES 14803 Registered Cummins CES 14439 Registered ASTM D6210  
Jenbacher Technical Instruction 1000-0200 (All engine types and all versions)

#### MEETS OR EXCEEDS:

ASTM D3306 & D6210	John Deere	Paccar
Case New Holland	Komatsu	Peterbilt
CAT EC-1	Link-Belt	Scania
Detroit Diesel DF590K217ELC	Mack	Siemens Wind Turbines
Federal Spec A-A-8703	Man 324 SNF	Terex
Fiat Chrysler MS 12108	Mercedes-Benz DBL 7700	Thermo King
Ford Europe WSS-M07B44-D	MTU	TMC OF ATA RP-329B & RP-33B
Freightliner 48-02880	Navistar MP495 B-1 Type IIA	Volvo Construction Equipment
Isuzu JIS K 2234	Nitrite Free European OEMS	VW

ZEREX HD Nitrite Free RED ELC can also be used in:  
gasoline engines, stationary power, marine, natural gas, and light duty applications.

#### USAGE:

A 50% to 70% concentration range is suggested for optimum performance. ZEREX HD Nitrite Free RED ELC is compatible with major long life and conventional brands of ethylene glycol-based coolant. However, long life characteristics can be diminished by mixing with light duty or conventional fully formulated coolants. Valvoline recommends filling and then topping off ZEREX HD Nitrite Free RED ELC when the cooling system full and check concentration or freeze point regularly.



HOW THE TOUGH GET GOING.

## ZEREX™ HD NITRITE FREE RED EXTENDED LIFE ANTIFREEZE/COOLANT

AVAILABLE NOW!

**2-EHA FREE**

Got silicone hoses? Many OAT coolants contain high levels of a corrosion inhibitor, known as 2-EHA, which can be harmful to silicone gaskets, seals and hoses. Zerex HD Nitrite Free Red coolant is free of 2-EHA, silicates and nitrites, helping preserve the components of your fleet's coolant systems.

This universal heavy duty coolant is fully backwards compatible for all engines requiring a Nitrite-Free Extended Life coolant (ELC), including those using ACERT or EGR technologies.

Guaranteed for 10 years/ 1,000,000 miles or 20,000 hours of service with NO supplemental coolant additives (SCAs) required.



CONCENTRATE - READY TO USE	6/1 GA 895612 895622	55 GA Drum 895614 895624	275 GA Tote 895616 895626
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## Zerex Nitrite Free AF/Coolant

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- > Compatible : Can be mixed with other coolants.
- > Durable: 1 Million Miles, 10 Years, 20,000 Hours
- > Low Maintenance:

# Zerex Nitrite Free: Low Maintenance



## **ZEREX NITRITE FREE EXTENDED LIFE**

- Next generation technology provides 6 years / 600,000 miles or 12,000 hours of service life with no addition of supplemental coolant additives (SCA's) needed or recommended
- For use in all heavy-duty engines requiring a Nitrite-Free Extended Life Coolant (ELC) product including those using ACERT or EGR technologies. Backwards compatible for OAT applications
- Silicate-free, amine-free, and borate-free formula protects cylinder liners and water pumps from cavitation erosion-corrosion. Lubricates water pumps
- Patent pending formula meets or exceeds the following industry and engine specifications:  
Cummins 14603, CAT EC-1, Case New Holland, DAF MAT 74002, Detroit Diesel DFS93K217ELC, Freightliner 48-22880, John Deere, Mack, Man 324 SNF, MTU, Navistar CEMS B-1 Type IIIA, Mercedes-Benz DBL 7700, Paccar, Porsche/Audi, Scania, Siemens

## Zerex Nitrite Free AF/Coolant

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- > Compatible : Can be mixed with other coolants.
- > Durable
- > Low Maintenance:
- > Suitable: For Heavy Duty Diesel Engines



# Moving to Nitrite Free



## Overview – Change to ELC Factory Fill

- **When / What**

- In the first quarter of 2015, Daimler Trucks North America will be changing from Nitrite Organic Acid Technology (NOAT) Extended Life Coolant (ELC) to nitrite-free Organic Acid Technology (OAT) ELC.

- **Why**

- DDC testing has demonstrated that nitrites contained in NOAT can cause breakdown of the coolant.

- **Impact to existing vehicle orders**

- Orders specifying NOAT ELC will be converted to OAT. Orders specifying conventional coolant will not be affected.

- **Service Impact**

- ✦ ➤ Draining and refilling of trucks currently filled with NOAT is NOT required.
- ✦ ➤ Rules for coolant top-off allow customer to maintain only one coolant, OAT.
  - New test strip technology allows coolant maintenance using similar methods as today.
  - New test strip technology (OAT Detection) is more effective than current nitrite strips.
- ✦ ➤ Service intervals for OAT are the same as they were with NOAT.
- Coolant Extenders for OAT will be available, just as they are today with NOAT.



# Aluminum in Modern Engines

TRANSPORT TOPICS October 3, 2016 — 57

## Coolants Convert Into Organic Solutions In Aluminum Engines, Maintenance Exec Says

By Fran Matso Lysiak  
Equipment Editor

RALEIGH, N.C. — The increasing use of lightweight aluminum in engines will likely bring with it a conversion to nitrite-free organic acid technology, or OAT-NF, coolants, according to a maintenance executive at an industry meeting here.

Aluminum is replacing steel because its high-strength, low-weight properties help truck makers meet federal greenhouse-gas emissions standards by boosting fuel economy. At a Sept. 20 meeting here of the Technology & Maintenance Council, Homer Hogg, manager of technical development for Travel Centers of America/Petro, said the switch in metal should be coupled with a change to OAT-NF coolants.

"It's just a matter of weight," Hogg told TRANSPORT TOPICS.

Coolants are now called upon to protect more aluminum than steel, Hogg said, so the industry is transitioning to the new coolants. He said nitrites have been removed from new coolants to adjust to some manufacturing processes and benefit more aluminum in engines.

The servicing industry must react to that quickly because it can be very costly, he said. "In fact, it can take your entire engine down \$50,000-plus per engine ... if you do not get this right." Hogg was one of the speakers on the

panel at the session, titled "The Evolution of Engine Coolants."

Coolants feature many technologies and colors, and knowing the difference between them is important for maximum coolant system protection, according to the meeting program.

OAT-NF coolants are quickly becoming the preferred specification among manufacturers and fleets, the meeting program said.

If a fleet has different types of vehicles, it doesn't want to be responsible for managing multiple types of anti-

freeze, said Hogg, who develops technical solutions for TA Truck Service's coast-to-coast network, primarily in the truck shop division.

"It would be challenging on your inventory and challenging on your training programs, so you try to have one consistent type of coolant," Hogg said.

That is what many in the industry are struggling with, he said, noting many of the questions at the session concerned whether one antifreeze can be used for all of a fleet's engine

platforms. The answer, he said, is yes, but for the nitrite-free coolants.

Over the past year or so, the transition to nitrite-free occurred on a broad scale in the industry, Hogg said. Not everyone has moved to this type of coolant, but the majority has, he said.

The new coolant is required by some of the engine manufacturers, such as Daimler, Hogg said. Other manufacturers are recommending it.

TMC is a division of American Trucking Associations.

# Aluminum in Modern Engines

Nitrite-Free Coolants on the Rise Due to More Aluminum in Engines | Transport Topics .... Page 1 of 3

## Transport Topics

3/17/2017 4:00:00 PM

### Nitrite-Free Coolants on the Rise Due to More Aluminum in Engines

This story appears in the March 13 print edition of Equipment & Maintenance Update, a supplement to Transport Topics.

As manager of technical development for TA and Petro travel centers, Homer Hogg sells a lot of coolant to fleets of all sizes. In 2010, he started seeing something strange: a white residue plugging coolant filters and coating cylinder liners.

"I was receiving calls on a regular basis, and pictures and all kinds of frightening-type scenarios from our technical support center," he said. "I was getting pictures of coolant filters that were totally restricted from this white residue."

**BEST OF MARCH E&MU:** [More stories, columns](#)

It's because of that residue, and other issues with nitrite-based coolants, that nitrite-free coolants are projected to more than double as a percentage of the market by 2023. But not every fleet is making the switch yet — and some should not.

The issue is rooted in manufacturers light-weighting Class 8 engines by using more aluminum and less steel to improve fuel efficiency and reduce greenhouse-gas emissions.

Coolants with nitrite organic acid technology react with the flux used to braze aluminum parts together. That reaction changes the coolant's acidity, increasing metal corrosion and leading to undissolved solids and residue that plug filters, coat heat exchangers and cause scale on cylinder liners. This reaction can prevent heat from escaping and cause a localized heat spot, potentially leading to a fuel pre-ignition.

Meanwhile, nitrites deplete rapidly, requiring the addition of supplemental coolant additives. Overuse of nitrites when servicing can lead to pitting and leaks of thin-walled aluminum heat exchangers.

In other words, "Old coolant technology met new truck technology, and the match wasn't quite right," said Colin Dilley, vice president of technology for Prestone Products Corp.

In response, coolant suppliers have produced coolants based on nitrite-free organic acid technology, or OAT, for Class 8 over-the-road technology.

David Turcotte, technical director at the Valvoline Co., said organic acids don't deplete, and they protect metal surfaces well. Intervals for the nitrite-free OATs are six years, 600,000 miles or 12,000 hours — about the rebuild point for a motor, so ideally, a fleet won't have to change the coolant at all. They are more expensive per container but require less maintenance, meaning there is less potential for problems when technicians overdose with additives. Turcotte said.



Steve Brawner

## ZEREX™ NITRITE FREE EXTENDED LIFE ANTIFREEZE / COOLANT

### Developed to meet the long life coolant specifications of Heavy Duty vehicles

Fully formulated ZEREX Nitrite Free ELC incorporates organic acid technology to protect diesel engines from liner pitting and hard water scale deposits. The silicate and nitrite free extended life chemistry protects all cooling system metals from corrosion including aluminum. ZEREX Nitrite Free ELC can also be used in gasoline engines, stationary power, marine, natural gas and light duty applications.



### ZEREX Nitrite Free Extended Life Antifreeze/Coolant Features:

- Next generation technology provides 6 years / 600,000 miles or 12,000 hours of service life with no addition of supplemental coolant additives (SCAs) needed or recommended
- For use in all heavy-duty engines requiring a Nitrite Free Extended Life Coolant (ELC) product including those using ACERT or EGR technologies
- Backwards compatible for CAT applications
- Provides excellent heat transfer as compared to silicate coolants
- Excellent protection against corrosion, erosion or pitting on all cooling system metals. Enhanced oxidation control of aluminum alloys and lead solder
- Helps improve water pump life and reduce flow passage blockage due to silicate-free formulation. Helps lubricate water pumps
- Silicate-free, amine-free, and borate-free formula protects cylinder liners and water pumps from cavitation erosion-corrosion
- Contains anti-scaling properties, aluminum and copper/brass corrosion protection, resists gel precipitation formation, and provides thermal stability to protect the engine and cooling system from damage



### Nitrite Free Extended Life is formulated to meet or exceed the following antifreeze specifications:

- ASTM D3306
- ASTM D6210
- Case New Holland
- CAT EC-1
- Cummins 14603 Registered
- Cummins 14636
- Detroit Diesel DFS93K217/ELC
- Federal Spec A-A-870A
- Fiat Chrysler MS 12106
- Ford Europe WSS-M97B44-D
- Ford Trucks (2019 and newer)
- Freightliner 48-22880
- GM 6277M
- Isuzu
- International
- JIS K 2234
- John Deere
- Kenworth
- Komatsu/Isuzu
- Komatsu
- Link Belt
- Mack
- Man 324 SNF
- Mercedes-Benz DBL 7700
- MTU
- Navistar MPAPS B-1 Type IIIA
- Nitrite Free European OEMS
- Paccar
- Peterbilt
- SAE J814, SAE J1034, SAE J1941
- Scania
- Siemens Wind Turbines
- Terex
- Thermo King
- TMC of ATA RP-329
- TMC of ATA RP-329B
- TMC of ATA RP-338
- Volvo Construction Equipment
- VW

### ZEREX Nitrite Free ELC Antifreeze/Coolant Part Numbers

846435	ZEREX HD Nitrite Free ELC	6/1 Gallon
846440	ZEREX HD Nitrite Free ELC	55 Gallon Drum
846437	ZEREX HD Nitrite Free ELC	6/1 Gallon
846438	ZEREX HD Nitrite Free ELC Ready To Use	55 Gallon Drum

**ZEREX**  
BY Valvoline

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## Zerex Nitrite Free AF/Coolant

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- > Compatible : Can be mixed with other coolants.
- > Durable: 10 years, 20K hours, 1 million miles
- > Low Maintenance: No additives needed or recommended
- > Suitable: For Heavy Duty Diesel Engines  
For Light Duty Trucks and Automobiles too!

## ZEREX™ CROSS REFERENCE CHART

CHEMISTRY																ZEREX is Approved (*) or Recommended/Meets (✓) in the following applications															
	COLOR	Continental (ZF) Motor Oils	Ford Motor Oil Technology (FMT)	Hyundai Synthetic Lubricant Technology (HSLT)	Industrial Hydraulic Systems Fluid Technology (IHSFT)	Prior Chemical Safety Information (PSI)	Selenia Synthetic Lubricant Technology (SLS)	Shell Rotella Multi-Grade Engine Oil Technology (RMEOT)	Valvoline Multi-Grade Engine Oil Technology (VMEOT)	Wynn's Engine Oil Technology (WEOT)	Zerex Original Green Technology (ZOGT)	GM	FORD	Chrysler	Toyota, Honda, KIA, Nissan, Hyundai & more	VW Audi	Caterpillar	Cummins	Detroit Diesel	John Deere	Navistar	Mack	MAN	Mercedes-Benz	MTU	Paccar	Scania	Volvo	Siemens Wind turbines	GE Windturbines	
ZEREX ORIGINAL GREEN	GREEN	•										1996 & OLDER	2002 & OLDER	OLDER		1982-13	90TB-6	75E298		CEMS B-1 TYPE I											
ZEREX DEX-COOL®	ORANGE	•										1997 - CURRENT * 99G277M	2012 (CARD) 2013 & NEWER VSS-W07B44-D	2013 & NEWER	✓	✓										✓	✓	✓			
ZEREX G05®	GOLD		•									1999A, 1825M	2000-2011 (FRANK) 2009-2011 (JARI) VSS-W07B1-41*	2002-2013		EC-1	CES 14603 *	*75E298 *APPROVED	*APPROVED	✓	✓		*APPROVED	*APPROVED	✓				*APPROVED		
ZEREX ASIAN VEHICLE	PINK RED BLUE			•											HYUNDAI KIA NISSAN HONDA SUBARU SS-40211 JSA-X-2214-1994																
ZEREX HEAVY DUTY PRE-CHARGED	GREEN			•								1999A, 1825M	✓	✓		✓	✓	75E298	✓	✓	✓				R220-170-87						
ZEREX HEAVY DUTY FULLY FORMULATED	PINK RED			•								1999A, 1825M	✓	✓		✓	✓	CEMS B-1	✓					R220-170-87							
ZEREX HEAVY DUTY EXTENDED LIFE	RED			•								1999A, 1825M	✓	✓		EC-1	CES 14603, 3066206	75E298	✓	CEMS B-1 TYPE II	✓			✓							
ZEREX NITRITE FREE ELC	YELLOW				•							GM 4277M, 1899A, 1835M	✓	✓	✓	✓	EC-1	CES 14439	DF593K217ELC	✓	CEMS B-1 TYPE IIIA	✓	✓	✓	✓	✓	✓	✓	✓	✓	
ZEREX G-20™ FUEL CELL COOLANT	PURPLE		•									✓											✓								
ZEREX G30®	PURPLE		•									✓	✓	✓	✓		90TB-6	APPROVED	✓			MAN 324 SFW	✓	*APPROVED		✓	✓	*APPROVED			
ZEREX G40®	PINK		•									✓	✓	✓	VW TL 774-J*		CES 14603	DF593K217ELC APPROVED	✓			MAN 324 TYPE S-GAT	MD 325.S	*APPROVED		✓					
ZEREX G48®	BLUE		•									1999A, 1825M	✓	✓	VW TL 774-C		90TB-6	75E298				MAN 324 MF	*APPROVED	*APPROVED			*APPROVED 2015 & OLDER YEAR MODELS				
ZEREX G93®	GREEN		•																					*APPROVED							
ZEREX 2792® PG	BLUE						•					1999A, 1825M	✓	✓		✓	✓	75E298	✓	CEMS B-1 TYPE II	✓			R220-170-87							



# Valvoline Performance Guarantee



## VALVOLINE™ HEAVY DUTY

Performance is the only proof of product quality. With the Valvoline Performance Guarantee, Valvoline assures customers that Valvoline products will perform.

The Valvoline Performance Guarantee is simple: If there are any equipment problems directly resulting from the use of Valvoline lubricants and/or antifreeze/coolant products ("Covered Products") that do not meet our published specifications (generally available at [www.valvoline.com/our-products/pi-sheets](http://www.valvoline.com/our-products/pi-sheets)), Valvoline will pay for the reasonable cost of repairing the affected component(s), provided that:

1. The claim is submitted to Valvoline Engineering & Technical Services within 30 days of the equipment problem and before repairs are made;
2. Any diagnostic or other reports you have received from a mechanic or similar specialist documenting the problem are included in the claim submission;
3. The Covered Product was used in accordance with Valvoline and the equipment manufacturer's recommendation;
4. The damaged component(s) were maintained in accordance with the manufacturer's recommendations, including those relating to quality levels and service interval;
5. Proof of purchase of the Covered Product(s) and, if available, a sample of the product(s) used are included with the claim; and
5. You purchased the Covered Product within two (2) years of the date the claim is submitted to Valvoline.

PLEASE NOTE: Valvoline may inspect (and you agree to make available) the affected component(s), equipment, and maintenance records to determine the extent of damage and verify that a Covered Product was the cause of the claimed equipment problem. The Valvoline Performance Guarantee does not apply if Valvoline reasonably determines that the equipment problem was caused (in whole or in part) by something other than a Covered Product. To obtain component repairs under this limited warranty, customers must contact their Valvoline representative or submit to:

**Valvoline, LLC**  
Valvoline Engineering & Technical Services  
100 Valvoline Way  
Lexington, KY 40509

**LIMITED WARRANTY**

THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER REMEDIES AND WARRANTIES, EXPRESSED OR IMPLIED OF FITNESS FOR A PARTICULAR USE OR OTHERWISE. THIS WARRANTY DOES NOT COVER NORMAL WEAR OF PARTS AND/OR DAMAGE RESULTING FROM ANY OF THE FOLLOWING: NEGLIGENCE OR MISUSE OF THE PRODUCT OR EQUIPMENT, OR DAMAGE DUE TO USE CONTRARY TO THE SPECIFICATIONS OR OPERATING INSTRUCTIONS OF THE PRODUCT OR EQUIPMENT. THIS WARRANTY DOES NOT COVER ANY ALLEGED INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, ALLEGED DAMAGES RELATING TO RENTAL EXPENSES OR THE LOSS OF USE OF THE VEHICLE. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES SO, THE ABOVE LIMITATION AND EXCLUSIONS MAY NOT APPLY.

## Zerex Nitrite Free AF/Coolant - Summary

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One Coolant to rule them all – the only one you need

- > Compatible : Can be mixed with other coolants.
- > Durable: 10 years, 20K hours, 1 million miles
- > Low Maintenance: No additives needed or recommended
- > Suitable: For Heavy Duty Diesel Engines  
For Light Duty Trucks and Automobiles too!



HEAVY  
DUTY

## A COMPLETE PRODUCT LINE ENGINEERED FOR EXCEPTIONAL PERFORMANCE.



Engine Oils



Coolants



Transmission  
Fluids  
for manual, automated  
manual & automatic



Gear Oils



Greases



TRUSTED FOR 150 YEARS\*

ENGINE OILS

COOLANTS


GREASES



# The “Premium” in Premium Blue

**HEAVY  
DUTY**






## THE ENGINE OIL ADVANTAGE

Premium Blue™ Extreme	Premium Blue™ One Solution Gen2	All-Terrain
<b>SAE 5W-40 Synthetic Engine Oil</b>	<b>SAE 15W-40 &amp; 10W-30 Engine Oil</b>	<b>SAE 15W-40 &amp; 10W-30 Engine Oil</b>
<ul style="list-style-type: none"><li>• Provides advanced fuel economy up to 1.5% over 15W-40 conventional oils in on-highway operation</li><li>• Superior synthetic basestocks provide faster, safe starts during freezing weather and enhanced thermal properties for hot weather operations</li><li>• Enhanced protection against oil oxidation</li><li>• Excellent deposit protection</li></ul>	<ul style="list-style-type: none"><li>• Premium lubricant designed to protect engines fueled by diesel, natural gas, or gasoline under severe service in both on and off highway applications.</li><li>• Reduce working capital with inventory consolidation by eliminating the need for multiple engine oils. can also help avoid critical failures by reducing the potential for human error.</li><li>• Outstanding oxidation resistance supports long oil life in heavy duty diesel and natural gas engines</li><li>• Excellent wear protection in heavy duty applications.</li><li>• Superior deposit protection compared to industry requirements</li><li>• Unique 5,000 miles oil drains extension in Cummins X15/X12 engines when average is 7 mpg or higher</li></ul>	<ul style="list-style-type: none"><li>• Designed for HD diesel equipment operating in severe duty cycle including high idle time</li><li>• Provides critical wear protection under extreme load regimes</li><li>• Formulated to provide oil longevity for heavy duty equipment operating in high temperatures</li></ul>
		

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**TRUSTED FOR 150 YEARS™**

# Valvoline Heavy Duty Diesel Oil Comparison Chart

						
Premium Blue Extreme 5W-40 	Rotella T-6	Delo 400 XSP	Delvac 1 ESP		Triton ECT	Syndurance +
Premium Blue One Solution Gen2 15W-40 & 10W-30 	Rotella T-5	Delo 400 XLE	Delvac Extreme	Vecton	Guardol ECT	700
All-Terrain 15W-40 & 10W-30	Rotella T-4	Delo 400 SDE	Delvac 1300	CRB Multi	Fleet Supreme EC	600
15W-40 & 10W-30	Rotella T2/T3	Ursa	Mobil HDEO			500 15W-40

VALVOLINE HEAVY DUTY ENGINE OIL

# VALVOLINE PREMIUM BLUE ONE SOLUTION GEN2



HEAVY  
DUTY

Increased Protection | Proven Performance

Valvoline Premium Blue One Solution Gen2 Engine Oil is "The Only One"™ exclusively endorsed and recommended by Cummins.

Once again Valvoline™ innovates with Valvoline Premium Blue One Solution™ Gen2 an Extraordinary Premium engine oil formulated to provide extended oil drain intervals for Heavy Duty Diesel and Natural Gas Engines.



## FULLY BACKWARD COMPATIBLE

Recommended for use in buses, trucks, and other service fleets fueled by Diesel, Gasoline, CNG (Compressed Natural Gas), LNG (Liquefied Natural Gas) or propane. Premium Blue One Solution Gen2 is fully backwards compatible in natural gas engines requiring CES 20085. In diesel applications it can be used where API Service CK-4, CJ-4, CI-4 PLUS, CI-4, CH-4, SN and all prior API gasoline categories are called for.

## APPLICATION GUIDE

OEM	TEST	ENDORSED	APPROVED
API	CK-4		✓
API	CES 20082, CES 20086	✓	✓
MAack	EOS-4.5		✓
VOLVO TRUCKS	VDS-4.5		✓
DETROIT DIESEL	DFS 63K222		✓
RENAULT TRUCKS	VI RLD-3		✓



For any product related questions please call  
1-800-TEAM-VAL

Premium Blue One Solution Gen2 also meets or exceeds the requirements for Caterpillar ECF-3, Mercedes-Benz MB 228.31, ACEA E7/E9, MTU 2.1, MAN M3775, Deutz DQC III-18 LA

HOW THE TOUGH GET GOING.™

TRUSTED FOR 150 YEARS™

VAL-05-0752-156 8/2020 Valvoline 3200™ Trademarks, Reproduction or use without permission, registered to Valvoline Corporation

10W-30	6/1 QT 881428 882879	3/1 GA 891017 891007	5 GA Pail 891015 891005	5 GA ABB 891025	55 GA Drum 891013 891011	325 GA Tote 891019 891009	BULK 891003 891001
--------	----------------------------	----------------------------	-------------------------------	--------------------	--------------------------------	---------------------------------	--------------------------





HEAVY  
DUTY

## VALVOLINE PREMIUM BLUE ONE SOLUTION GEN2

FEATURES & BENEFITS:

### THE ONLY ONE ENDORSED

Premium Blue One Solution Gen2 is a premium blend engine oil developed thru our **25 year close collaboration with Cummins** to perform and protect engines fueled by **diesel, natural gas, or gasoline**. Valvoline™ Premium Blue™ One Solution Gen2 is the only engine oil endorsed and recommend by Cummins.



"Premium Blue One Solution Gen2 demonstrated the best oxidation performance measured by Cummins internal testing as part of the CES 20092 specification development. Extensively tested, Valvoline Premium Blue One Solution Gen2, is formulated to perform in diesel, natural gas and gasoline engines and helps reduce working capital investment with inventory consolidation."

-James Scarbrough (Chief Engineer - Spark Ignited Platforms, Cummins Inc.)

### ELIMINATES THE NEED FOR MULTIPLE ENGINE OILS

Designed to protect engines fueled by diesel, natural gas, and gasoline under severe service in both on and off highway applications, allowing you to consolidate your inventory, increase your working capital and avoid critical failures by reducing the potential for human error.



Full-size pickup



Minibus



Large walk-in



City delivery



Medium conventional



Heavy conventional



City transit bus



Refuse truck



Dump truck



Cement truck

HOW THE TOUGH GET GOING.



AMERICAN OWNED & OPERATED

### EXTENDED DRAIN INTERVALS IN CUMMINS DIESEL ENGINES

By sharing technology and product development at every level with over millions of thousands of hours and millions of miles of engine laboratory and real world testing, Valvoline and Cummins have taken engine lubrication to a whole new level, increasing another 5,000 miles to existing Oil Drain Intervals for X12 and X12 engine models.\*

	Severe <5.0 mpg	ShortHaul 5.0 - 5.9 mpg	Normal 6.0 - 6.9 mpg	Light >7.0 mpg
Premium Blue One Solution Gen2	30,000 miles	45,000 miles	55,000 miles	80,000 miles
Everyone Else	25,000 miles	40,000 miles	50,000 miles	75,000 miles

\* Usage 5,000 mile drain extension for Premium Blue One Solution Gen2 and premium blue Extreme in Cummins X12 engines enabling up to 80,000 miles when average fuel efficiency is 7 mpg or higher.

### HEAVY DUTY DIESEL PERFORMANCE YOU CAN RELY ON - THE GEN2 ADVANTAGE



- Oxidation resistance that exceeds industry limits by at least 53%
- 90% Viscosity Control against CK-4 limits, providing continued engine Protection
- 33% Piston deposit reduction compared to API CK-4 limits
- 20% Better Wear Protection when compared to CK-4 limits
- 65% Corrosion Control

\* Relative performance based on results from the Cummins ERM, EIR and Mack T-12 engine tests based on percent difference calculations.  
Relative performance based on results from the Caterpillar 19 and Caterpillar C-13 engine tests based on percent difference calculations.  
Relative performance based on results from the Volvo T-12 engine test based on percent difference calculations.

### EXTENDED DRAIN INTERVALS IN NATURAL GAS ENGINES

Valvoline Premium Blue One Solution Gen2 is the only engine oil endorsed by Cummins against CES 20092 and offers extended oil drain intervals in natural gas applications when compared to other CES categories. This new oil is specially designed to improve oxidation and thermal stability compared to other oils recommended in stoichiometric combustion natural gas engines (CES 20074 and CES 20085).

Engine Model	Premium Blue One Solution Gen2	Everybody Else
ISL G / L9N	1,500 hours	1,000 hours

## Premium Blue - Summary

---

- One oil for Diesel / Gasoline / Natural Gas (Propane/CNG/LNG)
- 5K Mile Extended Drain Under Warranty for most Cummins DF Engines.  
5K miles further than ANY other brand of oil.
- 500 Hours Extended Drain Under Warranty for many Nat Gas Engines



VALVOLINE HEAVY DUTY ENGINE OIL

# VALVOLINE ALL-TERRAIN

Harsh/Extreme Conditions | Severe Duty HD Diesel Fleets



Introducing Valvoline's newest premium Heavy Duty Diesel Oil specially formulated for equipment that operates in extreme duty cycles and severe conditions.

All Terrain has been developed specifically with a focus on wear protection in harsh environments.



## FULLY BACKWARD COMPATIBLE

Recommended for diesel engines in equipment used in severe applications such as loaders, dumpers, excavators, tractors and diesel trucks operating in a wide variety of environments calling for API service CK-4 and prior service categories CJ-4, CI-4 plus, CI-4, CH-4.

## APPLICATION GUIDE

OEM	TEST	APPROVE/ LICENSE	MEETS
API	CK-4	✓	
CES	CES 20086	✓	
DETROIT DIESEL	DFS 93K222	✓	
MACK RENAULT TRUCKS VOLVO TRUCKS	EOS-4.5   VDS-4.5 VRD-3	✓	
PACCAR	CK-4*		✓
NAVISTAR	CK-4*		✓
CAT	CK-4*		✓ ECF-3
Allison Transmission	TES-439**	✓	
Ford	WSS-M2C171-F1	✓	

\*OEM specifies the use of CK-4 approved engine oil. \*\*TES-439 only approved for 10W-40 viscosity. Logos/trademarks owned by third party.



For any product related questions please call 1-800-TEAM-VAL




15W-40 10W-30	6/1 QT 894077 --	3/1 GA 894015 --	5 GA Pail 894069 --	55 GA Drum 894063 894073	325 GA Tote 894503 894505	BULK 892873 892877
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HOW THE TOUGH GET GOING.



# All Terrain



## TECHNICAL INFORMATION BULLETIN

2021.001

### Valvoline All Terrain HD Engine Oil - Targeted Protection for Dirty Operations and Severe Duty Cycles

**Advanced Wear Protection in Challenging Applications:**  
The newest Valvoline Heavy Duty Engine Oil is specifically formulated for diesel engines and equipment that operate in extreme duty cycles and severe environmental conditions. Valvoline All Terrain is being made available in SAE 15W-40 and 10W-30 viscosity grades and has been developed with a focus on wear protection in harsh environments.

**For Customers Currently Purchasing Valvoline All Fleet E900:**  
Valvoline All Terrain meets or exceeds all performance and marketing claims of All Fleet E900 and can provide better wear protection in harsh applications; therefore, we have begun displacing the previous product using the All Fleet E900 part numbers, naming and packaging. That is to say that you may already be receiving the upgraded product and that changes will be coming to the part numbers, labeling/naming, packaging, and marketing claim documentation. Again, while the new product has been designed for advanced protection in harsher off-highway environments, it continues the protection you expect in your on road equipment.


Protection is NOT limited to demanding off-highway conditions and we have included the API licenses and OEM approvals in Table 1 to show the consistent protection.

As you would expect, the new product/formulation has an additive chemistry different than our previous product; you should notice changes in your Used Oil Analysis (UOA) and perhaps in the appearance.

**Appearance / Color:**  
In the past there has been confusion as to the relationship between color and quality. Included are photo examples of All Fleet E900 and Valvoline All Terrain engine oils, we have included an example of the base oil that is used in both formulations. Note the base oil is water white (very clear) and color is a result of the additives. Darker does not necessarily indicate better performance, but the darker color from the additives should not be any cause for concern when compared to Valvoline All Fleet E900 or any other HDEO.

(Continued on Page 2)

Ford WSS-M2C171-F1
Allison TES-439
Mack/Volvo/Renault EOS-4.5/VDS-4.5/VI RLD-3
Detroit Diesel DFS 93K222
Cummins CES20086
API CK-4
Caterpillar (meets) ECF3
Caterpillar does not issue approvals




From Left to Right:  
All Fleet E-900, All Terrain, and to the far right  
Base Oil blend typical for both products.

2021.001

Michael Wedding—Engineering | Valvoline | Lexington, RI | 401.337.1000  
www.valvolinehd.com | www.valvolinefluidanalysis.com

# All Terrain



## TECHNICAL INFORMATION BULLETIN

2021.001

(Continued from Page 1)

**Used Oil Analysis: Changes**

Considering the typical new oil properties shown in Table 2, you should expect your oil analysis results to be impacted. After switching to Valvoline All Terrain, the information in your Used Oil Analysis reports will be slightly different from the tables shown due residuals or carry over of your previous product(s) inside the engine and in any bulk tanks that may be used. You will observe a transition to the nominal levels found in Table 2 over the course of your oil changes.

**TABLE 2: Nominal Lab Values for Oil Sample Properties**

SAE Viscosity Grade		Valvoline All Terrain		Valvoline All Fleet E900	
		15W-40	10W-30	15W-40	10W-30
KV@100°C (cSt)	cSt	15.1	12	14.9	12
KV 40°C (cSt)	cSt	119	83	113	82
HTHS @ 150°C	cP	4.2	3.5	4.2	3.5
Pour Point °C	°C	<-27	<-33	<-27	<-33
Density	g/cm³	0.879	0.866	0.877	0.868
Sulfated Ash	mass%	<1	<1	<1	<1
TBN	mg KOH/g	10.1	10.1	10	10
Zn	ppm	1240	1240	1100	1100
P	ppm	1135	1135	1010	1010
S	ppm	10	10	10	10
Ca	ppm	2420	2420	2420	2420
B	ppm	100	100	<10	<10
Mo	ppm	90	90	<10	<10

**Communication with Testing Labs:**

Valvoline's Technical Services team has and will continue to communicate these changes to the major testing facilities. As they become aware of the different formulation that they might receive in customer samples, their diagnosis will be more accurate. If you have any questions about variances received in oil analysis after the conversion, please contact your Valvoline Heavy Duty representative or reach out to the Valvoline Technical Support line at 1-800-TEAM-VAL.



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## All Terrain - Summary

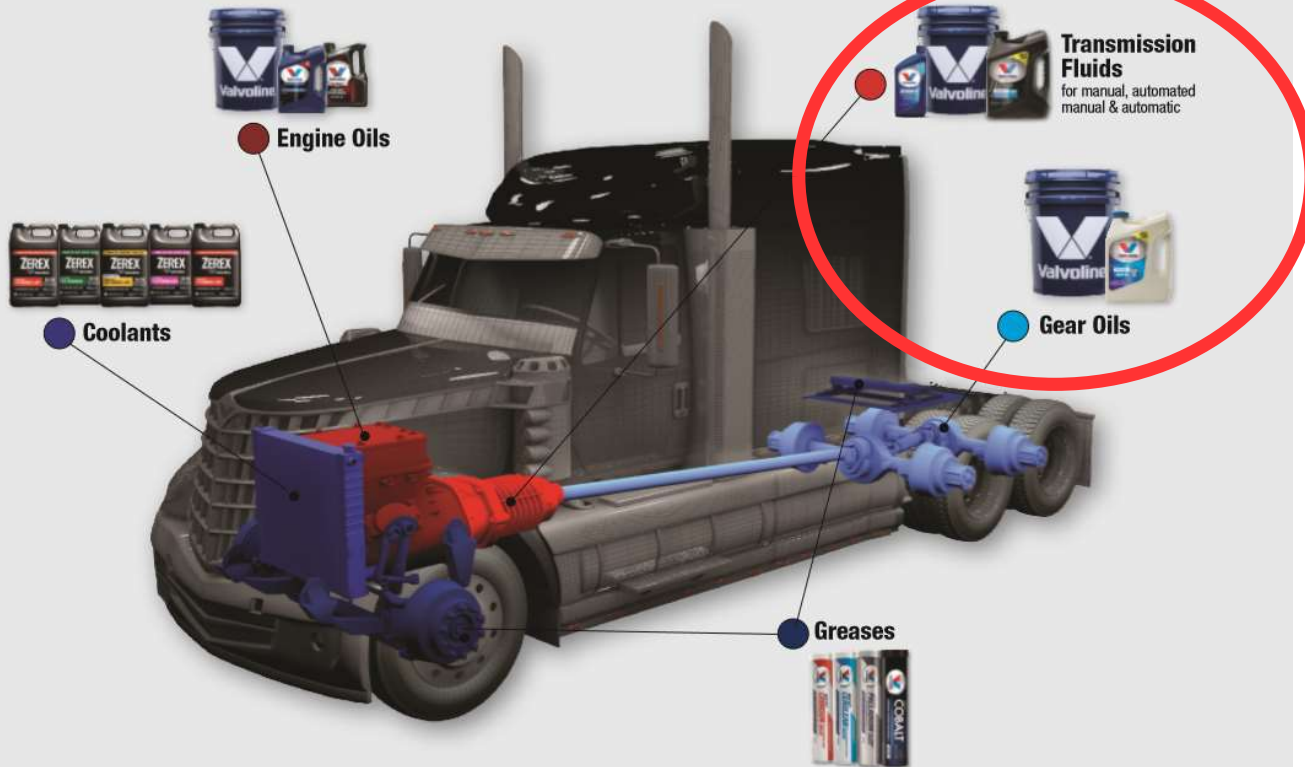
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- > Formulated for Severe Duty Applications
- > Diesel only applications (Ford approved)
- > CK-4 approved, so fine for normal or light duty too
- > 20-30% more Zinc and Phosphorus than most DF/Gasoline oils
- The best product for high idle, stop and go, Ag and Construction



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## A COMPLETE PRODUCT LINE ENGINEERED FOR EXCEPTIONAL PERFORMANCE.



TRUSTED FOR 150 YEARS

ENGINE OILS

COOLANTS

GREASES



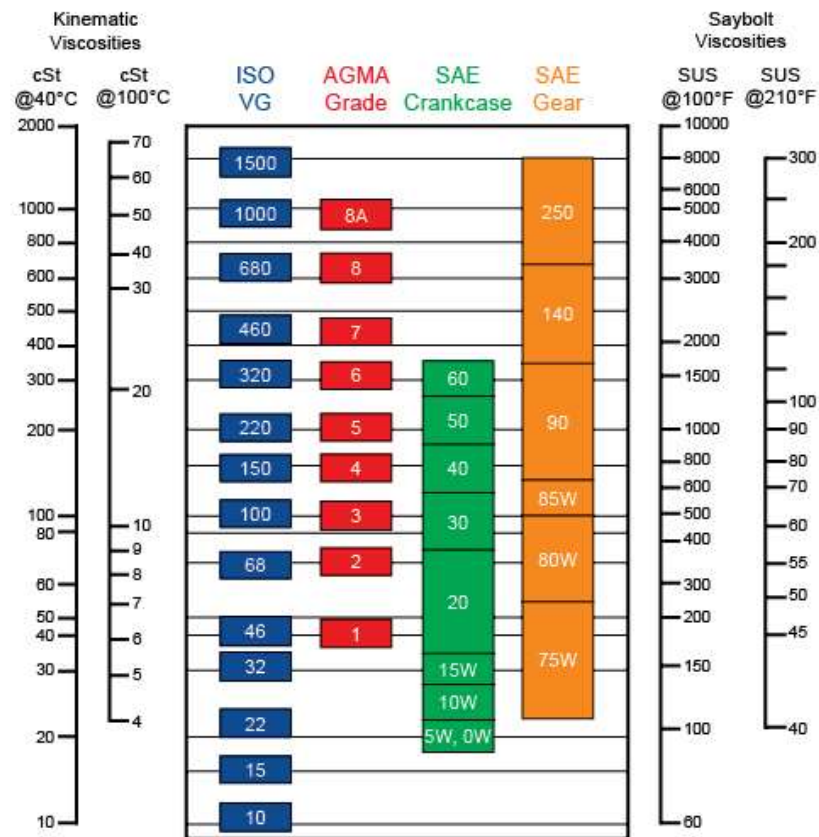
# A PORTFOLIO OF GEAR & TRANSMISSION OILS FOR A VARIETY OF APPLICATIONS



	OEM	APPLICATION	NORMAL DUTY	SEVERE DUTY	SPECIFICATIONS	VALVOLINE RECOMMENDED PRODUCT	VALVOLINE OTHER OPTIONS
AXLE	DAWA	Linehaul	500,000		SHAES 256 Rev C	Syn Gard Gear Oil 75W-90	
		Vocational (Off-Highway)		180,000	SHAES 429	Syn Gard Gear Oil 80W-140	
	DETROIT DIESEL	Axle	300,000	150,000	MB 235.8 or DFS 93K219.01	Syn Gard Gear Oil 75W-90	
	MACK	Axle	250,000		GO-J	Valvoline HD Gear Oil 85W-140 & 80W-90	Valvoline HD Synthetic SAE 75W-90 Gear Oil or Syn Gard Gear Oil 80W-140
			500,000		GO-J Plus	SYN GARD Gear Oil 75W-90	
	MERITOR	Axle	100,000		076 A	Valvoline HD Gear Oil 85W-140	
			100,000		076 B	Syn Gard Gear Oil 80W-140	
			100,000		076 D	Valvoline HD Gear Oil 80W-90	
			100,000		076 E	Valvoline HD Synthetic Gear Oil 75W-90	Syn Gard Gear Oil 75W-90
			250,000		076 N	Valvoline HD Synthetic Gear Oil 75W-90	Syn Gard Gear Oil 75W-90
			500,000		076 N*	Valvoline HD Synthetic Gear Oil 75W-90	Syn Gard Gear Oil 75W-90
			150,000		076 Q,R	Valvoline HD Gear Oil 80W-90 & Valvoline HD Synthetic Gear Oil 75W-90	Syn Gard Gear Oil 75W-90 & 80W-140
TRANSMISSION	ALLISON	HD 1000-4000 series	150,000	50,000	TES 668/ TES 295	Syn Gard 668 ATF	Syn Gard ATF ES
		AT / MT / HT	100,000	50,000	TES 295	Syn Gard 668 ATF	Syn Gard ATF ES
		5000 / 6000 / 8000 / 9000 Series			TES 439	PBOS Gen2	
	DETROIT DIESEL	DT12-HE	300,000	180,000	MB 235.11	Syn Gard MDT 75W-90	
		DT12-H	400,000	300,000			
		DT12-HL		400,000			
	EATON	UltraShift Plus	500,000	180,000	PS-386	SYN GARD E-386	HD Synthetic Trans Fluid SAE 50
		Manual transmissions (2016 - )					
		Manual transmissions (Before 2016)					
	MACK	M-drive / MaxiTorque ES	250,000	40,000	97307	SYN GARD IS 75W-80	
		All Manual Transmission / Automated Manual	250,000		TO-A	Valvoline HD Synthetic Transmission SAE 50	
			500,000		TO-A Plus	SYN GARD E-386	
		T300 Series Manual Transmission	250,000		GO-J	Valvoline HD Gear Oil 85W-140 & 80W-90	Valvoline HD Synthetic SAE 75W-90 Gear Oil or Syn Gard Gear Oil 80W-140
			500,000		GO-J Plus	SYN GARD Gear Oil 75W-90	
	MERITOR	ZF Meritor Transmission	250,000		0-81	Valvoline HD Synthetic Transmission SAE 50	
	PACCAR	Paccar Transmissions (Before 2017)	500,000	180,000	PS-386	SYN GARD E-386	
		Paccar 12 Speed Transmissions (After 2017)	750,000				
	VOITH	Automatic Transmission	37,500		Voith H55.6335.33	Syn Gard ATF ES	
			75,000		H55.6336.33(G1363)	Syn Gard ATF ES	
	VOLVO	I-shift	250,000	40,000	97307	SYN GARD IS 75W-80	
	ZF	Automatic Transmission	37,500	18,750	ZF TE-ML 03D, 04D, 14B, 17C, 20B, 25B	Syn Gard ATF ES	

# Viscosity Chart

## Viscosity Grading Systems





# MULTI-VEHICLE MANUAL TRANSMISSION FLUID

## Covers 95% of manual and automated-manual transmissions in North America\*

Extensively field-tested, this dual-application manual transmission fluid demonstrates excellent protection against wear in long haul applications, and is extended drain capable. Using synthetic base stocks, Valvoline HD Multi-Vehicle Manual Transmission Fluid maintains its viscosity in hot temperatures and flows easily in cold temperature conditions, making it suitable for use in a wide range of environments.

- Broad-spectrum application usage, ideal for mixed fleets
- Recommended for use in the following applications:

Eaton PS-386 (out-of-warranty)	MACK T0-A Plus
Eaton PS 164 Rev 7	Meritor O-81
Volvo STD 1273,18 (97318) (out-of-warranty)	Navistar/International TMS 6816
Volvo STD 1273,15 (97315)	ZF Freedomline Manual Transmissions
Volvo STD 1273,07 (97307)	DANA Manual Transmissions
Mack m-Drive	API GL-4
Detroit DT12 Automated Manual (out-of-warranty)	API MT-1

- Synthetic fluid with excellent pumpability
- Meets API GL-4 and MT-1 specifications



**Consolidate your inventory today with this first-of-its-kind fluid!**

MULTI-VEHICLE MANUAL TRANSMISSION FLUID				
	5 GA Pail 899365	55 GA Drum 899363	TOTE 899361	BULK 899242

\* In Class B trucks

## Transmission / Axle Oil - Summary

---

- The right viscosity and wrong additive package means premature wear.
- Using one product for everything usually isn't the best approach.
- Consolidating to the fewest products requires working with your Carson Representative to get it right.
- Valvoline is introducing a near-Universal Manual/Automated-Manual product by the end of the year that will make transmission choices easier.



HEAVY  
DUTY

## A COMPLETE PRODUCT LINE ENGINEERED FOR EXCEPTIONAL PERFORMANCE.



TRUSTED FOR 150 YEARS\*

ENGINE OILS

COOLANTS

GREASES

# VALVOLINE™ HEAVY DUTY GREASE REFERENCE CHART



## KEY CHARACTERISTICS

	NLGI GRADE	THICKENER	OPERATING RANGES (°F)	DROPPING POINT (°F)	BASE FLUID VISCOSITY*	PERFORMANCE & PROTECTION					
						WEAR & FRICTION CONTROL	EXTREME PRESSURE	SHOCK LOADS	CORROSION	STAY IN PLACE	WET APPLICATION
<b>VALVOLINE COBALT™</b>	2 1	LITHIUM SULFONATE COMPLEX	30 - 350 0 - 300	>500	*PRESSURE ACTIVATED TECH.	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
<b>PALLADIUM™</b> WITH 9% MOLY	2 1	LITHIUM COMPLEX	30 - 350 0 - 300	>500	ISO 320	★★★	★★★	★★★	★★★	★★★	★★★
<b>PALLADIUM™</b> WITH 3% MOLY	2 1 0	LITHIUM COMPLEX	30 - 350 0 - 300 -20 - 300	>300 475 450	ISO 320	★★★	★★★	★★★	★★★	★★★	★★★
<b>CERULEAN™</b>	2 1 0	LITHIUM COMPLEX	25 - 350 -10 - 300 -25 - 350	>500 475 450	ISO 320	★★★	★★★	★★	★★★	★★★	★★★
<b>CRIMSON™</b>	2	LITHIUM	25-250	380	ISO 220	★★	★	★	★★	★★	★★★

## APPLICATIONS

	MINING	QUARRY	CONSTRUCTION	TRUCKING	VOCATIONAL	INDUSTRIAL	AGRICULTURE
<b>VALVOLINE COBALT™</b>	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
<b>PALLADIUM™</b> WITH 9% MOLY	★★★	★★★	★★★	★	★	★	★★
<b>PALLADIUM™</b> WITH 3% MOLY	★★★	★★★	★★★	★	★	★	★★
<b>CERULEAN™</b>	★	★★	★★	★★★★	★★★★	★★★★	★★★★
<b>CRIMSON™</b>	★	★	★	★★	★★	★★	★★

## SPECIALTY

<b>AXLE HUB GREASE #00</b>	Designed specifically for on-highway trailer axle hub bearings to reduce leaky wheel seals and minimize the potential of oil contaminated brake shoes.
<b>HD PUMP GREASE #000</b>	Designed specifically for the packing ends of hydraulic pumps to withstand high heat and maintain mechanical stability when subjected to frequent temperature changes.
<b>5TH WHEEL GREASE #2</b>	Designed specifically for fifth wheel top plate applications where stay-in-place performance is critical under all weather and application conditions.

\*Valvoline Cobalt™ offers protection equivalent to base oils ranging from ISO 220 to ISO 1000 using proprietary additive blends and Pressure Activated Technology. Micro encapsulated additives, when released under pressure, produce an extraordinary protective barrier by delivering ISO 1,000 film strength to the metal surface, thus ensuring a thick lubricating film between moving parts.



# Cobalt Grease: The numbers don't lie

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
	ASTM Method	Frontier Silver 70	Lubriplate 1200-2	DA Duraplex 3	Certified Permabead #2	Permabead #2	Schaeffer #274 Moly EP	#238 Ultra Supreme	Lucas Red N Tacky #2	Cat Desert Gold #2	Valvoline Cobalt #2	Valvoline Cerulean	Valvoline Crimson	Valvoline 3% Moly Grease	Valvoline 5% Moly Grease	Chevron Ultra Duty #2	Ulti-Flex Grease EP #2	Ultiplex Synthetic #15	Delo Grease EP	Delo Grease ESI	
Typical Properties																					
Thickener Type		Lithium Complex	Lithium Complex	W/Calcium	m Complex	m Complex	m Complex	m Complex	Lithium Complex	Sulfonate	Sulfonate	Lithium Complex	Lithium	Lithium Complex	Lithium Complex	Lithium	Lithium Complex	Lithium Complex	Lithium Complex	Lithium Complex	
ISO Viscosity Grade Base Oil Equivalent		450								425	1000 360-1000	320	220	320	320	460	320	460	220	220/320	
Viscosity, Kinematic	D445						800		1000												
Viscosity, Kinematic cSt at 40 C			183					226		370-425						400	383	302	226	261	
Viscosity, Kinematic cSt at 100 C			17					25		38-42						24	25	32			
Viscosity Index							105		86	125						76	85	145	107	98	
Flash Point							560/293	540/282								525/274	525/274	550/288	525/274	525/274	
Texture								Tacky			Tacky					Stringy	Stringy	Smooth	Tacky	Tacky	
Color			Beige			Red	Black	Gray	Red	Gold/Gray	Blue	Blue	Red	Gray	Gray		Red	Purple	Tan	Blue	Red
Molybdenum Disulfide Content		contains	none	3%			3%	5%	none	5%	none	none	none	3%	5%	none		none	none	none	
Worked Penetration, @77F	D217		265-295	265-295				280		265-295	280					280	280	315	280	285	
Mobility @60F (15.6C), g/min	US Steel										>160	200	350 min	200	200						
Dropping Point, F/C	D2265	550	400/205	386/197	500/260	500/260	500/260		540	575/302	500/260	>500F	380	>500F	>500F	374F/190C	491/255	536/280	491/255	511/266	
Operating Temperature F/C								350F/177C		450/232	350F/177C	350F/177C	250F	350F/177C	350F/177C	230/143	350F/177C	450/232	350/177	350/177	
Point Contact Equipment Life Extension																					
4-ball weld load, 200kg	D2596	800	360	400	315	400	315	500	315	620	>800	500	250	500	500	315	500	500	315	400	
4-ball wear @ 40kg	D2266			0.6			0.6	0.56	0.6	0.45	0.5	0.55	0.6			0.45	0.43		0.45	0.45	
Load /wear Index	D2596		62.7		50	53	45	76	40		>150	75	45	75	75		70	79		72	
Load /wear Index Scar @200kg, mm	D2596										<1.15										
Line Contact Equipment Life Extension																					
Timken OK Load, lbs, min	D2509	70	65		30	28	60	65	60	65	>70	60	45	60	60	70	75	50	50	80	
load) 1 hour test, non-replenished sump	509 modified																				
PSI rating, psi											Pass/>9,000	Pass									
Max Temp C											140										
Avg Coefficient of Friction, after 30 min break-in											0.03										
Extended test, hours to failure											>2										
<div>&lt; &gt; NLGI #2 NLGI #1 +</div>																					

# VALVOLINE™ HEAVY DUTY GREASE REFERENCE CHART



## KEY CHARACTERISTICS

	NLGI GRADE	THICKENER	OPERATING RANGES (°F)	DROPPING POINT (°F)	BASE FLUID VISCOSITY*	PERFORMANCE & PROTECTION					
						WEAR & FRICTION CONTROL	EXTREME PRESSURE	SHOCK LOADS	CORROSION	STAY IN PLACE	WET APPLICATION
<b>VALVOLINE COBALT™</b>	2 1	LITHIUM SULFONATE COMPLEX	30 - 350 0 - 300	>500	*PRESSURE ACTIVATED TECH.	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
<b>PALLADIUM™</b> WITH 9% MOLY	2 1	LITHIUM COMPLEX	30 - 350 0 - 300	>500	ISO 320	★★★	★★★	★★★	★★★	★★★	★★★
<b>PALLADIUM™</b> WITH 3% MOLY	2 1 0	LITHIUM COMPLEX	30 - 350 0 - 300 -20 - 300	>300 475 450	ISO 320	★★★	★★★	★★★	★★★	★★★	★★★
<b>CERULEAN™</b>	2 1 0	LITHIUM COMPLEX	25 - 350 -10 - 300 -25 - 350	>500 475 450	ISO 320	★★★	★★★	★★	★★★	★★★	★★★
<b>CRIMSON™</b>	2	LITHIUM	25-250	380	ISO 220	★★	★	★	★★	★★	★★★

## APPLICATIONS

	MINING	QUARRY	CONSTRUCTION	TRUCKING	VOCATIONAL	INDUSTRIAL	AGRICULTURE
<b>VALVOLINE COBALT™</b>	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
<b>PALLADIUM™</b> WITH 9% MOLY	★★★	★★★	★★★	★	★	★	★★
<b>PALLADIUM™</b> WITH 3% MOLY	★★★	★★★	★★★	★	★	★	★★
<b>CERULEAN™</b>	★	★★	★★	★★★★	★★★★	★★★★	★★★★
<b>CRIMSON™</b>	★	★	★	★★	★★	★★	★★

## SPECIALTY

<b>AXLE HUB GREASE #00</b>	Designed specifically for on-highway trailer axle hub bearings to reduce leaky wheel seals and minimize the potential of oil contaminated brake shoes.
<b>HD PUMP GREASE #000</b>	Designed specifically for the packing ends of hydraulic pumps to withstand high heat and maintain mechanical stability when subjected to frequent temperature changes.
<b>5TH WHEEL GREASE #2</b>	Designed specifically for fifth wheel top plate applications where stay-in-place performance is critical under all weather and application conditions.

\*Valvoline Cobalt™ offers protection equivalent to base oils ranging from ISO 220 to ISO 1000 using proprietary additive blends and Pressure Activated Technology. Micro encapsulated additives, when released under pressure, produce an extraordinary protective barrier by delivering ISO 1,000 film strength to the metal surface, thus ensuring a thick lubricating film between moving parts.

## Hydraulics and Other Interesting Products

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[Valvoline Hydraulic Oils](#)

[High Viscosity Index Hydraulic Oils](#)

[Valvoline Zinc Free Hydraulics](#)

[Valvoline Synthetic R&O](#)

[Valvoline Synthetic Gear Oils](#)

[Valvoline Low Viscosity Unitrac \(Tractor Hydraulic Oils\)](#)

[Multi-grade Drive Train Transmission Oils – UltraMax TO4-M](#)

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- Questions?
  - Next Steps?
  - Topics for the next session?



**Thank you!**

**Valvoline Heavy Duty Training**

**Presented by: Greg Batten, Heavy Duty Business Manager, West Region**