

PLUS-50™ II

PREMIUM ENGINE OIL



JOHN DEERE



Service Ratings

API diesel service categories: CK-4, CJ-4, CI-4 PLUS, CI-4, CH-4

API gasoline service categories: SN, SM, SL

ACEA (Europe) oil sequences: E9, E7

John Deere Severe Off-Road Dyno Engine Test

Applications

- For use in heavy-duty off-road applications, on-road trucks, marine engines, natural gas engines, pickups, and automobiles.
- Backwards compatible for use in all legacy diesel engine applications where Plus-50™ may have been applied.
- For use in John Deere Tier 4 engines and all diesel engines requiring API CK-4 oil.

Features/Benefits

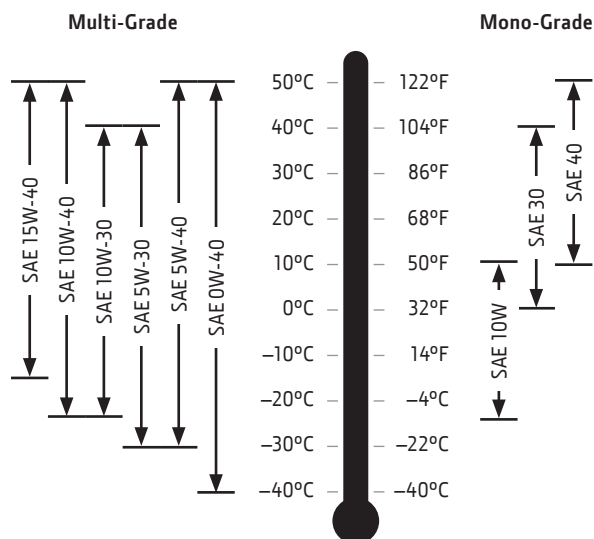
- Exceeds API CK-4 performance level for diesel engines.
- Exceeds API SN performance level for gasoline engines.
- Formulated specifically to inhibit oxidation, deposits, corrosion, and wear with superior soot control.
- Reduces maintenance costs and downtime.
- Provides maximum sludge and varnish control.
- Excellent low-temperature fluidity reduces engine wear in cold weather.
- Drain intervals may be extended up to 500 hours when used with John Deere filters in John Deere engines. (Review Operator Manual or consult with dealer for details.)
- Low ash technology to support Diesel Particulate Filter (DPF) service life.

Chemical and Physical Properties

Plus-50 II Test Parameters	15W-40	5W-40	0W-40	10W-30
Viscosity @ 40°C	128 cSt	95.9 cSt	95.0 cSt	86.6 cSt
Viscosity @ 100°C	15.6 cSt	14.1 cSt	14.7 cSt	12.1 cSt
Viscosity index	127	151	162	133
HTHS viscosity @ 150°C	4.30 cP	3.95 cP	3.70 cP	3.60 cP
Pour point	-36°C	-51°C	-57°C	-34°C
Flash point	225°C	237°C	228°C	223°C
Total Base Number (TBN) mg KOH/g	10.5	10.5	10.5	10.5
Sulfated ash level	1.0 mass %	1.0 mass %	1.0 mass %	1.0 mass %

John Deere Oils Air-Temperature Chart

Determine oil viscosity based on the expected air-temperature range during the period between oil changes.



PLUS-50™ II

Plus-50 II exceeds the requirements of the American Petroleum Institute (API) Service Category CK-4 for use in high-speed four-stroke diesel engines and is backward compatible to meet previous API engine oil classifications.

Plus-50 II premium engine oil has been designed to provide advanced lubricant performance in modern low-emission engines, and to meet the requirements of heavy-duty off-road applications, as well as lighter-duty applications including on-road vehicles.

Plus-50 II is recommended for four-stroke naturally aspirated, turbocharged, and supercharged diesel engines with Diesel Particulate Filters (DPF), Diesel Oxidation Catalysts (DOC), and Exhaust Gas Recirculation (EGR). Examples of applications include heavy-duty off-road equipment, vehicles with John Deere Tier 4 engines, vehicles requiring CK-4 oil, on-road trucks, marine engines, natural gas engines, pickups, and automobiles. Plus-50 II is also recommended for use in all legacy diesel engine applications where Plus-50 has been in use.

As part of the early development of Plus-50 II, John Deere engineers implemented the severe off-road dyno engine test, which incorporates the latest in engine emission technology.

Plus-50 II exceeds the demands of the John Deere severe off-road high-temperature dyno performance test. Proven performance along with extensive field testing allows extended drain intervals up to 500 hours when using Plus-50 II and John Deere filters for your John Deere engine. Refer to the Operator's Manual to validate the recommended change interval for your specific machine.

CK-4 oil, such as Plus-50 II, must be used with Tier 4 engines or significantly reduced DPF life will result.

Severe Off-Road Dyno Engine Test

In the development of Plus-50 II, John Deere engineers tested the oil under the most extreme conditions using this severe dyno test. The severe dyno test is a John Deere engine that runs at full load and high heat to thoroughly test the capabilities of the oil. At the end of the test we evaluate the engine parts and the oil to determine how well the oil protects the engine and how long it will last under such extreme conditions.

Pistons from the Severe Off-Road Dyno Engine Test

Competitive oil leaves soot and more piston deposits in the piston land and groove area and the undercrown area of the piston, which can cause the rings not to perform as designed. Plus-50 II is formulated for hotter off-road conditions to reduce piston deposits so the engine will perform optimally for a long time.

Minimizes Piston and Deposited Formulation

- Help reduce high friction and wear
- Help prevent excessive oil consumption and blowby
- Increase engine performance

Plus-50 II Premium Oil



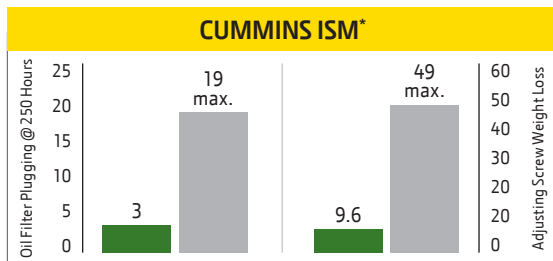
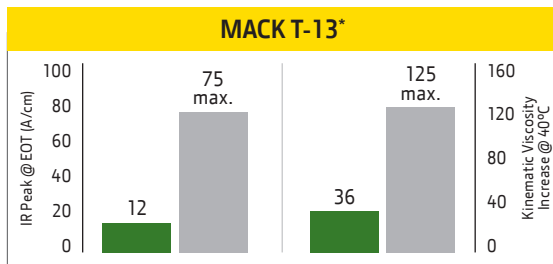
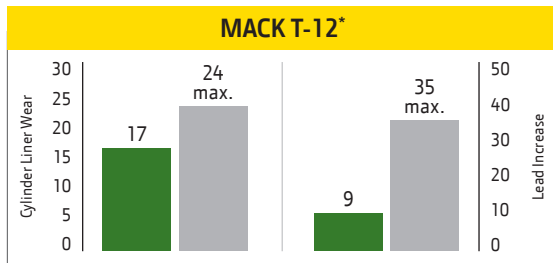
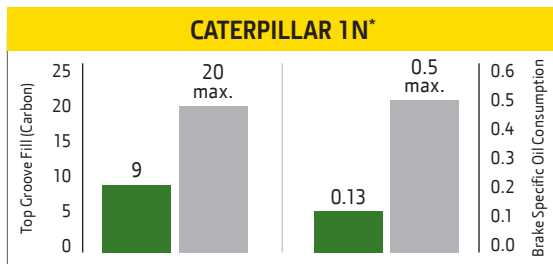
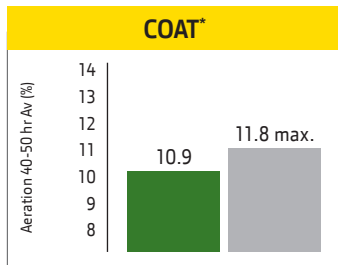
Competitor Premium Oil



Engine Tests for API CK-4

In addition to our own extensive testing, we also participate in all of the tests that define the minimum requirements of API CK-4 oil. For the comparisons represented by these graphs, lubricant test results must be at or below the CK-4 limit to be approved. Lower values are better. These results represent the magnitude at which Plus-50 II™ exceeds the performance metrics that make up the API requirements for CK-4.

■ Plus-50-II ■ CK-4 Limit



*Lower is better.

Like any other industry engine oil standards, API CK-4 is a minimum specification basically developed for on-highway usage. Plus-50 II exceeds API CK-4 criteria and contains more stringent John Deere internal requirements for severe off-road applications. In these color-coded graphs, the gray bar represents the CK-4 maximum limit. Lower values are better. The charts show the superior performance of Plus-50 II when compared to the API CK-4 limits and other oil standards.

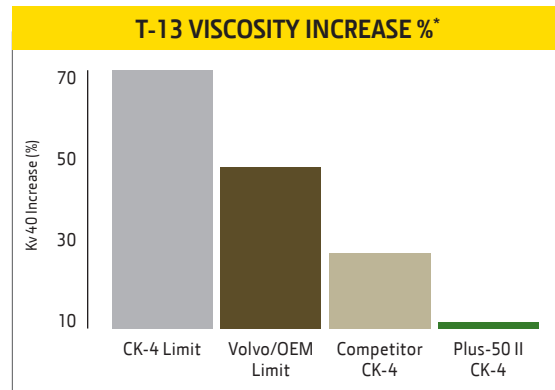
API CK-4 Engine Tests

So how do we know that Plus-50 II exceeds CK-4 requirements? The charts below show how we not only meet CK-4 requirements but exceed them. As you look at the results, remember, less is better.

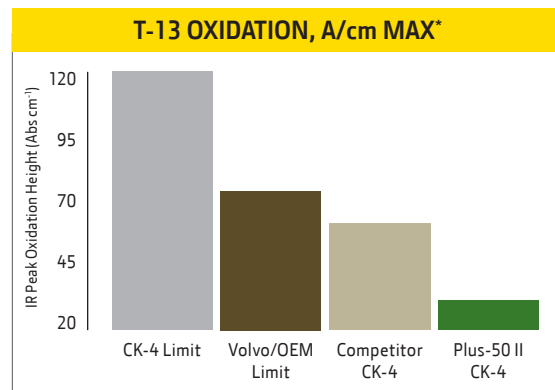
The first chart shows the viscosity increase, or how much the oil thickens. Viscosity increase can cause deposits, which quickens engine wear. As you can see, Plus-50 II had minimal increase in viscosity.

The second chart shows oxidation, or oil being subjected to high temperatures. Lower oxidation means longer life. Again, Plus-50 II is well below the CK-4 limit.

Oil Thickening



Oil Oxidation

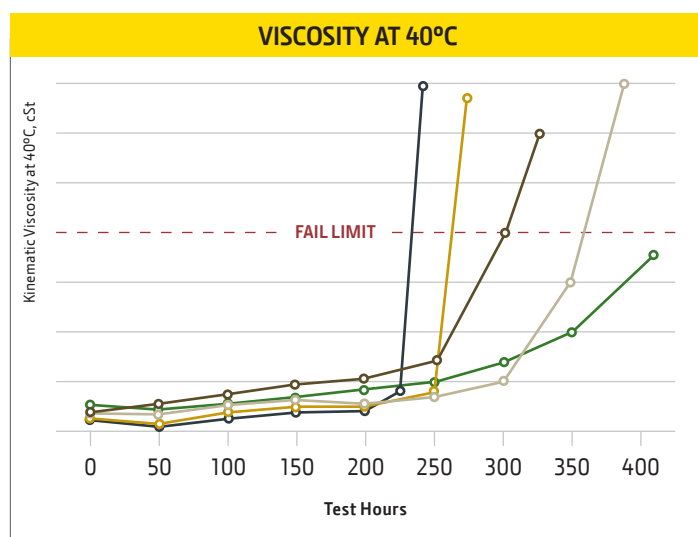
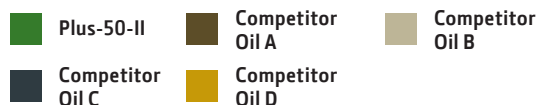


*Lower is better.

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Severe Dyno Engine Test

Plus-50™ II vs. Competitive Engine Oils



Full Fleet Solution

Plus-50 II is a premium heavy-duty diesel and marine engine oil engineered for use in applications including off-road, farm equipment, construction, marine engines, mining, and industrial (pumps and generators). Plus-50 II is also perfectly suited to a variety of light- and heavy-duty applications, including over-the-road trucks, personal automotive, or commercial transportation. It is excellent for use with low- or high-sulfur diesel fuels in standard, turbocharged, or supercharged engines, including modern low-emission diesels such as those equipped with EGR systems.

Your engine deserves Plus-50 II. So does your operation. From homeowner to heavy-duty, down-in-the-dirt applications, Plus-50 II delivers the performance and protection you need for a successful operation. We put our name on it.

Formulated Specifically to Inhibit Wear Corrosion, Sludge, Soot, Varnish, and Oxidation

- Robust additive system and high-quality base oils
- Reduced oxidation (oil thickening)
- Viscosity remains stable throughout extended drain intervals
- Stays at 15W-40 (viscosity) grade until the end of drain interval
- Competitive oils viscosity increased over 100 percent
- Results in minimal deposit formation and optimal engine performance
- Other oils are not approved for extended intervals

What Makes John Deere Engine Oil Different from Standard Engine Oils?

At John Deere, engine oil products are being created or improved at the same time new machines are being developed. We are ready with products that provide the best protection the day a machine is sold to a customer.

Our machines are designed to work in heavy-duty off-road conditions. Most standard engine oils are developed for on-road applications. It's important for a customer to match the engine oil and service intervals to the type of work the machine is doing. The more robust the work, the more hardy the oil needs to be.

Superior Product for Current and Older Engines

Plus-50 II oil is a robust oil that provides excellent protection for your engine. It allows you to extend drain intervals by 50 percent when you use John Deere filters and can save you more than 30 percent in maintenance costs. Plus-50 II is ahead of the curve when it comes to emission standards. Although most of our equipment did not need to meet Tier 4 regulations until 2011, we made Plus-50 II available two years early so our customers could be prepared.

Do Competitive Oils Developed for Minimum Equipment Requirements Result in Cost Savings?

John Deere provides customers with high-performance fluids that will result in fewer machine failures and longer oil life for more savings to customers in the long run.

If John Deere does not set the standard, competitors will not make the improvements required for our new machines.

John Deere never compromises quality to save money up front.

You may have seen this comparison between on-highway and off-road applications as we recognize four major performance challenges for off-road applications:

The first is **Higher Load Factor**: Off-road applications experience higher load and mechanical stress, which means more engine wear.

The second is **Increased Thermal Stress**: Oil temperature in a tractor is about 10 deg. C higher than in a semitruck, effectively doubling the rate of oil degradation.

The third is **Fuel Sulfur Content**: 500-ppm sulfur limit for off-road versus 15-ppm Ultra Low Sulfur Diesel for on-highway and sulfur-degraded oil.

The fourth is **Dust and Moisture**: When drawn into the engine, dust causes abrasive wear and moisture produces corrosion, which are not problems for applications on clean, paved highways.

