



OIL AND THE TIER 4 INTERIM ENGINE

Our last two tech articles have dealt with several critical maintenance aspects of the Tier 4 Interim (T4i) engine — how to keep ultra-low sulfur fuel clean and explaining the regeneration mystery of DPF (diesel particulate filter). *FOCUS* now looks at the kind of engine oil needed for T4i engines, as the type of engine oil used has a significant impact on the performance of this new technology.

First, let's remember what functions engine oil performs:

- **Lubricates moving parts to reduce friction**
- **Seals the cylinders**
- **Absorbs and dissipates heat**
- **Cleans**
- **Absorbs shocks**
- **Helps engine run smoothly**
- **Prolongs engine life**

So oil must be formulated to not only keep a protective oil film on moving parts and resist high temperatures, corrosion, and rusting, it must also prevent rings from sticking and sludge formation, and resist both foaming and breakdown after prolonged use.

Oil can work for only so long before its properties become compromised. That's why manufacturer maintenance intervals should be followed closely. If oil is not changed when recommended, it will become dirty and its additives wear out. Acid can form as well as sludge and varnish. If this is

allowed to continue, deposits will form on the engine, and contaminants in the oil will harm engine parts.

API CJ-4 ENGINE OIL

CJ-4 oil is required for all machines with a DPF. It is specifically formulated to meet the unique needs of T4i engines as well as protect older engines, so you can use CJ-4 across your fleet. It exceeds previous performance requirements, and is specifically designed to sustain and protect emission control systems, help comply with emissions standards, reduce engine wear, and control piston deposits and oil consumption.

CJ-4 oil has been required for virtually all new on-highway trucks purchased since 2007 and on almost all new construction equipment since 2010. This means CJ-4 oil is already widely available and widely used.

Using just one oil for all machines is easier and safer. However, if you still have a substantial supply of non CJ-4 oil left, use it in older machinery until the supply is depleted. Then use CJ-4 in all machines. NEVER use non CJ-4 oil in newer machines — you will void the new-engine warranty and cause a heap of expensive problems.

One key difference between older and CJ-4 formulations is that CJ-4 is a low-ash oil, with strict limits placed on the amount of phosphorus, sulfur, and sulfated ash content. Ash is a natural component of lube oil, and all engines burn a small amount of oil. But unlike particulate matter (PM) or

hydrocarbons, ash cannot be burned off; it slowly accumulates in the DPF. So the lower the ash level to begin with, the longer it will take to build up in the DPF, extending its life.

CJ-4 oil also provides optimum protection for control of catalyst poisoning, particulate filter blocking, engine wear, piston deposits, low- and high-temperature stability, soot handling properties, oxidative thickening, foaming, and viscosity loss due to shear.

Note that because the chemical makeup of CJ-4 oil is different than older formulations, used-oil analysis programs will show a different profile.

CHANGING THE OIL

Use of CJ-4 oil in Z7-Series Kawasaki wheel loaders means oil change intervals are 500 hours — reducing maintenance time and costs.

It's easy to access key engine components on Kawasaki Z7s. Be sure to warm up the engine first. That way contaminants and foreign materials are mixed with the oil and will be drained out with it. After you install the filter and fill the engine with oil, be sure to run the engine and check for possible filter leaks. Always keep good maintenance records of all oil and filter changes to ensure long engine life.

Engine oil is just one aspect of keeping your T4i Kawasaki wheel loader in tip-top condition. Our next maintenance article will look at HN bushings, hydraulic oil, and other lubricants.