

CJ-4 / CI-4 PLUS

What's Best For Your Engine?

For the first time in memory, two classifications of oil for diesel engines will be available from most suppliers. That means the next time you change oil, you'll find yourself making a decision you never faced before - to purchase CI-4 Plus or CJ-4. Which one to use and whether to use one or the other for particular conditions are some of the questions being asked.

Almost every aspect of oil performance improved with the introduction of a newer classification of oil. Until now, all new improved oil classifications were completely "backward compatible." That means the newest classification of oil could be used in all older engines. That's why the earlier classifications quickly disappeared from the marketplace. That won't necessarily happen this time. Oil developed for engines with 2007 emission controls still does all the basic functions of lubricating, cooling and cleaning. But so much has changed with the new engines, that the new oil classification, CJ-4, is made with significantly different technologies. And because CJ-4 is so different, most suppliers will continue to provide the previous oil classification, CI-4 Plus, in the foreseeable future.

To decide which is best for your use, you must understand the differences. To maintain performance at acceptable levels, oils have been upgraded to withstand these added stresses. Since 1972, when the first American Petroleum Institute oil classification, CD, was created for turbocharged diesels, the Heavy Duty Oil Classification Panel of the American Society for Testing and Materials has been developing tests and standards for oil performance to meet the demands of newer engines as they are introduced to the market. The first oil to undergo standardized testing was CF. It was measured only for piston deposits and corrosion. The next oil, CF-4, added tests for soot thickening, valve train wear, ring and liner wear, and oil consumption. The latest oils must pass 12 tests, with standards higher than ever.

CJ-4 is designed for use in 2007 engines that must use ultra-low sulfur diesel with sulfur content limited to 15 parts per million. The 2007 engines all use after-treatment systems designed to reduce particulate matter - primarily soot and ash - in the exhaust. However, the exhaust includes ash, which cannot be burned off. The ash collects in the after-treatment system's diesel particulate filter, which is commonly referred to as a DPF. Inside the DPF, the ash that is formed when engine oil burns will eventually build up, clogging the DPFs. It must then be cleaned out. If less ash forms, the filter will operate longer before it needs to be cleaned out. The ash - which is called sulfated ash - forms when oil components react with sulfur contained in both the fuel and the oil itself. Phosphorus, a pressure-resistant anti-wear additive in oil, contributes to ash formation.

To control ash, oil refiners developed "low SAPS technology." That means CJ-4 classification oils have low sulfated ash, phosphorus and sulfur. Oils are formulated with acid-neutralizing additives containing alkaline or base metals. Since ULSD has 97% less sulfur than previous fuel, the new engines don't need as much alkalinity, measured as total base number. So CJ-4 oils have lower alkalinity, or TBN, than older CI-4 Plus oils. With CJ-4 oils obviously designed to meet the needs of the 2007 engines, the question arises, "What is the best choice for pre-2007 engines?"

Because of low SAPS and ULSD, you can use CJ-4 in any diesel engine on the road today. That is what “backward compatible” means. And, the oil companies say CJ-4 is a better oil than the CI-4 Plus. While it costs about 20 percent more than CI-4 Plus, CJ-4 is designed to suspend soot and contamination in finer sizes and greater quantities than the previous classification. It withstands heat better, improves wear protection, controls deposits, improves oil consumption and has better soot-related viscosity control. And, CI-4 Plus has higher alkalinity or TBN.

If you operate a pre-2007 truck, you can select either oil. You can continue to run extended oil drain intervals established using oil analysis. In fact, because you won't be creating as much sulfuric acid burning ULSD, you will probably be able to extend drain intervals even longer because the higher alkalinity or TBN in CI-4 Plus will take longer to use up the reserve alkalinity.

Initial tests by oil companies indicate that engine wear will be significantly reduced with CJ-4. However, the formulations were only finalized in late 2005, so measurements with those oils done were after only 200,000 to 250,000 miles of service. If you switch to CJ-4 and have been maintaining an extended service interval, you should draw samples regularly and use oil analysis to make sure the new oil will stand up. Whenever you run extended intervals and something changes - fuel, oil, loads, routes or anything significant at all - you should always verify through sampling.

Obviously, with 2007 engines, you have no choice but to use CJ-4. If you're faced with an emergency situation where you must add oil to a 2007 vehicle but have only older oil, you can top off without damaging the engine. But you should drain the oil at the earliest possible opportunity and refill with CJ-4. CI-4 Plus will not harm a new engine when used for a short time period, but it will have an impact on when the DPF will need to be cleaned. How much impact will depend on how much oil was added and how long it stayed on. If there are only a few thousand miles on the mixed oils, and you have a pre-2007 truck, you can safely re-use the mixture in the older truck. You can re-use the oil that has been drained from the 2007 truck in a pre-2007 truck, only if the oil has been kept clean and it does not have too many miles on it. You can also put it in gallon jugs and use it to top-off oil in pre-2007 trucks.

For some, CI-4 Plus will be more than adequate. Others may benefit from a change to CJ-4, balancing higher costs against longer engine life. Still others with several trucks will find it worthwhile to use both classifications, but they must take care and not mix them up in inventory or in the 2007 engines.

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