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Service Information Bulletin

SUBJECT	DATE
Fluids and Lubrication Requirements	August 2013

Additions, Revisions, or Updates

Publication Number / Title	Platform	Section Title	Change
DDC-SVC-MAN-0080	DD Platform	Fluids and Lubrication Requirements Lubricating Oil Requirements	Changed the oil requirements.
DDC-SVC-MAN-0075	DD Platform	Pre-Lubricating the Engine	Added the oil requirements.
DDC-SVC-MAN-0175	EuroIV DD15		
DDC-SVC-MAN-0075	DD Platform	Checking and Monitoring the Oil Level	Added steps to the oil monitoring procedure.
DDC-SVC-MAN-0175	EuroIV DD15		

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2 Fluids and Lubrication Requirements

Oxidation of the particulate matter in the fuel is the key to filter performance. This requires that the catalyzing agent (platinum-coated passages) are providing optimum enhancement to the oxidation process. The following fuel requirements must be met, otherwise the Aftertreatment warranty may be compromised:

- Use Ultra-Low Sulfur Diesel (ULSD) fuel (15 ppm sulfur content maximum), based on ASTM D2622 test procedure.
- Lube oil must have a sulfated ash level less than 1.4 wt %; currently referred to as CJ-4, CI-4/SM CI-4 Plus.

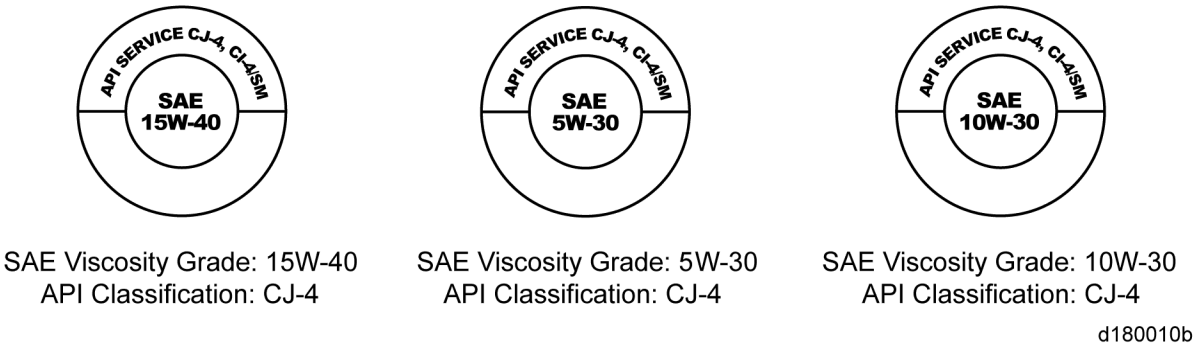

Figure 1. Oil and Fuel Labels

Biodiesel Fuels

Biodiesel fuels meeting ASTM D 6751 specification, prior to blending can be mixed up to 5% maximum by volume in petroleum diesel fuel. Detroit highly recommends biodiesel fuels made from soybean or rapeseed oil through the proper transesterification reaction process. Other feedstock source of biodiesel fuels such as animal fat and used cooking oils are not recommended by Detroit. The resulting mixture must meet ASTM D 975 specification. More information is available on http://www.demanddetroit.com.

NOTE: Biodiesel fuels can decrease the life of fuel filters and degrade their water coalescing ability. It is Detroit's recommendation that fuel filter maintenance intervals be reduced by 50% if fuels with greater than 5% biodiesel are used in the engine 50% of the time or more.

Diesel Exhaust Fluid

Diesel Exhaust Fluid (DEF) contains urea and purified water which meets the stringent purity requirements of ISO 22241. DEF can maintain a safe shelf life of 12 months when stored between 15-85°F and begins to freeze around 12°F. Diesel Exhaust Fluid is a key component of Selective Catalytic Reduction (SCR) systems when mixed with the engine's exhaust to convert smog-forming nitrogen oxides (NOx) into harmless nitrogen and water vapor. Diesel Exhaust Fluid is colorless, odorless and is classified as a nonhazardous material by the EPA. It is less toxic than most other automotive fluids and is biodegradable. Despite its classification, it still requires special handling since it can cause skin and eye irritation. Contaminated or otherwise unusable amounts must be properly disposed of or preferably recycled. DO NOT dispose of DEF in sewer drains or into the environment. Refer to the product MSDS or dispose of in accordance with all applicable local, state, and federal regulations.

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Figure 2. API Label

3 Lubricating Oil Requirements

Statement of Policy on Supplemental Fuel and Lubricant Additives

DD Series engines will operate satisfactorily on good quality commercial fuels and lubricants provided by the petroleum industry through retail outlets.

Supplementary additives include all products marketed as fuel conditioner, smoke suppressants, masking agents, deodorants, tune-up compounds, top oils, break-in oils, graphitizers, and friction-reducing compounds. The regular and continued use of supplementary additives in fuels and lubricants is not recommended.

NOTE: Detroit is not responsible for the cost of maintenance or repairs due to lack of required maintenance services performed or the failure to use fuel, oil, lubricants and coolant meeting Detroit-recommended specifications. Required maintenance and use of proper fuel, oil, lubricants and coolant are the responsibility of the owner. See the OEMs guidelines for details.

Used Lubricating Oil Analysis Guidelines

These values indicate the need for an immediate oil change, but do not necessarily indicate internal engine problems requiring engine tear-down. Characteristics relating to lubricating oil dilution should trigger corrective action to identify and find the source(s) of leaks, if the values listed in the Table are realized. Contact your DDC distributor or dealer regarding oil analysis services.

Table 1. Single Sample Used Oil Analysis Warning Limits

Characteristics	ASTM or Other Methods	Conditions Measured	Four-Stroke Cycle Engine DD Series
Viscosity	D 445 - DIN 51562	Engine & Oil	—
Kv100 °C, cSt., Min.	—	—	12.5 SAE 15W-40
Kv100 °C, cSt., Max.	—	—	21.9 SAE 15W-40
Soot, % Max.	E1131(TGA)†	Engine Combustion	4.5 (4.5)*
Pentane Insolubles, Max.	D 893 - DIN 51565	Engine Combustion	1.0 (N/A)*
Total Base Number, Min.	D 4739	Oil	1/3 New Oil
Total Base Number, Min.	D 2896 - ISO 3771		1/3 New Oil
Glycol, Max.	D 2982 - DIN 51375	Engine	Negative
Water, Max.	D 1744	Engine	0.3%
Fuel Dilution, Max.	D 3524	Engine	7.1%
Iron, Max. §	D 5185	Engine Wear	200
Copper, Max. §	D 5185	Engine Wear	50
Lead, Max. §	D 5185	Engine Wear	10
* With API CJ-4 / CI-4 Plus Oil, 93K218 approved list			
† Infrared spectroscopy (ASTM E168/DIN 51452) may also be used, provided it is calibrated to be equivalent to the TGA method.			
The DD Platform of engines are lead-free engines. No meaningful amount of lead should be found in the oil.			
D5185 Engine 100, d5188 Engine 150			
§ These are general limits. Wear metal limits must be determined for specific application and oil used.			

4 Pre-Lubricating the Engine

To ensure an immediate flow of oil to all bearing surfaces at initial engine startup, prepare the engines as follows:

NOTICE:
- Insufficient lubrication at startup can cause serious damage to engine components.
- Do not add oil if the oil reading falls on the crosshatch area of the dipstick. There are approximately 5.0 L (5.2 qt) from the fill mark to the full mark. Overfilling the oil pan can cause engine damage.

1. Charge the engine lubrication system with lubricating oil using a commercially-available pressure pre-lubricator.
2. Charge the engine lubrication system with lubricating oil using a commercially-available pressure pre-lubricator. Use only the heavy-duty oils recommended in the "How to Replace the Lubricating Oil and Oil Filter" section in this manual.
3. After pre-lubricating, check the engine oil level. If necessary, top off by filling engine oil no more than 5.0 L (5.2 qt) at a time through the oil fill cap to the satisfactory fill range on the oil dipstick. Do not overfill.

5 Checking and Monitoring the Oil Level

Check the oil level as follows:

WARNING: PERSONAL INJURY

To avoid injury from slipping and falling, immediately clean up any spilled liquids.

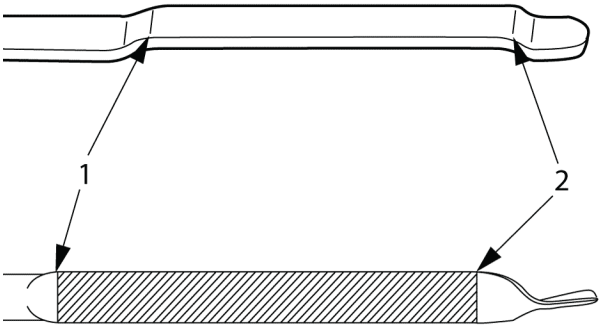
NOTICE: Do not add oil if the oil reading is in the crosshatch area on the dipstick. There are approximately 5.0 L (5.2 qt) from the fill mark to the full mark. Overfilling the oil pan can cause engine damage.

NOTE: If the engine operating temperature is below 60°C (140°F), the engine must be on a level surface and then shut down for 60 minutes for an accurate oil level reading. Otherwise, the engine must be brought up to an operating temperature of 60°C (140°F), parked on a level surface and then shut down for five minutes for an accurate oil level reading.

1. Check the oil level daily with the engine stopped and on a level surface. If the engine has just been stopped and is warm, wait approximately 20 minutes to allow the oil to drain back into the oil pan before checking.
2. Add oil to maintain the correct level on the dipstick. Use only the heavy-duty oils recommended in the "How to Replace the Lubricating Oil and Oil Filter" section in this manual.

NOTE: The dipstick has a positive locking device such as a lever or twist-lock design that must be disengaged before pulling the dipstick out of the guide tube.

3. Remove the dipstick from the guide tube. Use a shop rag to wipe off the end of the dipstick.
4. Wait 15 seconds to allow any crankcase pressure to dissipate through the guide tube and let the oil level settle in the oil pan.
5. Reinstall the dipstick and make sure it is fully inserted into the guide tube.
6. Remove the dipstick and read the oil level dipstick.
7. The figure shows a comparison between the bends on the dipstick and a crosshatch pattern on a conventional dipstick. Note the exact area noted on the bends. For example, the 'maximum' oil level will be at the BOTTOM of that bend. For the 'minimum' oil level, it is noted at the TOP of the bend. If the oil level is below the 'minimum' bend, add oil to bring it up the 'maximum' level. Do NOT fill beyond the maximum fill level on the dipstick, since overfilling may result in high oil consumption and possible severe engine damage.



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