DETROIT DIESEL

No.: 07 TS - 03
January 30, 2007

TO: Service Locations

FROM: Technical Service

SUBJECT: **Ultra Low Sulfur Diesel Fuel**

Question: What is Ultra Low Sulfur Diesel Fuel?
Answer: Ultra Low Sulfur Diesel fuel (ULSD) is diesel fuel with a maximum sulfur content of 15 parts per million (ppm) as defined by the United States Environmental Protection Agency (EPA). This is in contrast to regular Low Sulfur Diesel fuel (LSD) which has a maximum sulfur content of 500 ppm. *Failure to use ULSD in 2007 and later model year engines is illegal and prohibited by EPA.*

Q: Why do we need ULSD?
A: ULSD is *required* for 2007 and later model year diesel engines with exhaust aftertreatment devices. The lower sulfur content in ULSD is necessary for the proper operation of these aftertreatment devices. Reference Detroit Diesel publication 7SE270 “Lubricating Oil, Fuel And Filters”.

Q: When will ULSD become available?
A: In California, ULSD will be the *only* on-highway fuel available after September 1, 2006. Outside of California, ULSD will be widely available after October 15, 2006, and will co-exist with LSD until December 1, 2010, but most on-highway fuel outlets will essentially supply only ULSD. After December 1, 2010, ULSD will be the only on-highway fuel available.

Q: How can I tell if I’m buying ULSD at the pump?
A: Most diesel fuel pumps will have labels identifying which fuel they are dispensing. See the pictures below for examples of how the labels *may* look. Pumps in California may not have labels since the only fuel they can dispense after September 1, 2006 is ULSD.

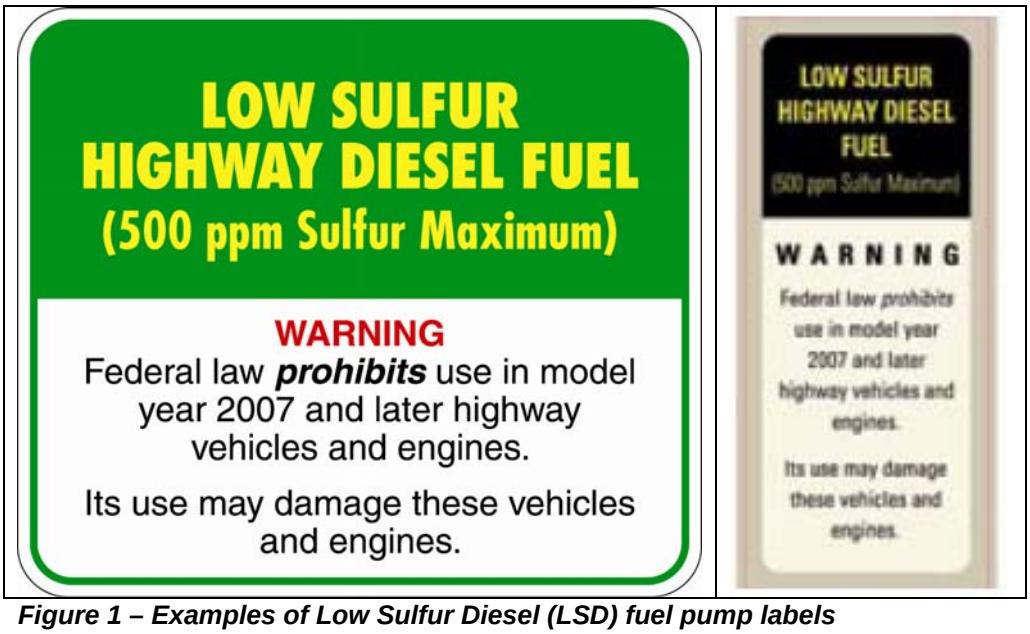

Figure 1 – Examples of Low Sulfur Diesel (LSD) fuel pump labels

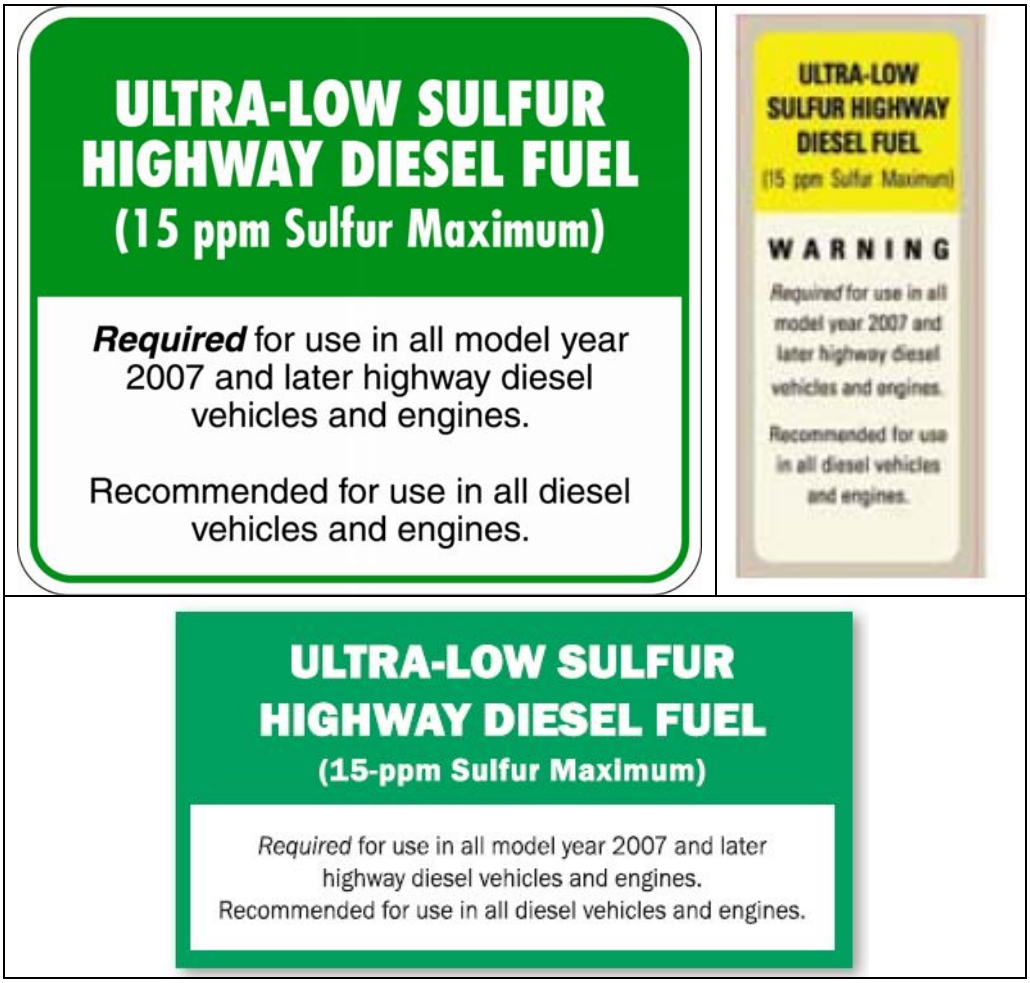

Figure 2 – Examples of Ultra Low Sulfur Diesel (ULSD) fuel pump labels

Q: What happens if I don't use ULSD in 2007 and later model year diesel engines?
A: ULSD must be used in 2007 and later model year diesel engines. Reference Detroit Diesel publication 7SE270 "Lubricating Oil, Fuel and Filters". The use of non-ULSD in these engines is illegal and punishable with civil penalties, and will damage the exhaust aftertreatment devices. The high sulfur content in non-ULSD fuel will result in sulfur poisoning of the aftertreatment devices, reduced efficiency of these devices, high backpressure, and eventual replacement. Exhaust aftertreatment devices damaged in this way may not be cleanable, which would result in a total loss of the core value and eventual scrapping of the device. Any damage caused by use of non-ULSD fuel in 2007 and later model year diesel engines will not be covered under Detroit Diesel warranty.

Q: Can I use ULSD in pre-2007 model year engines?
A: Yes. ULSD can be used in all Detroit Diesel on-highway engines built prior to 2007, including MBE and two-stroke engines. Remember that ULSD will essentially be the only on-highway diesel fuel available in 2007. Reference Detroit Diesel publication 7SE270 "Lubricating Oil, Fuel and Filters".

Q: What about aftermarket additives and ULSD?
A: Fresh, high quality ULSD does not need any additives. Additives can have a negative impact on ULSD, especially those additives that contain sulfur. Detroit Diesel does not endorse any specific aftermarket additive for use in any diesel fuel. Reference Detroit Diesel publication 7SE270 “Lubricating Oil, Fuel and Filters”.

Q: Will there be a biodiesel ULSD?
A: Yes. Reference Detroit Diesel publication 7SE270 “Lubricating Oil, Fuel and Filters”.

Q: How will ULSD affect pre-2007 engines in terms of power and fuel economy?
A: ULSD has slightly lower BTU (energy) content than LSD fuel. Power and fuel economy may drop up to 1-3% with the use of ULSD on these engines. ULSD will essentially be the only on-highway diesel fuel available in 2007 and it starts to become available during the last 6 months of 2006.

Q: What color is ULSD?
A: The refining processes for ULSD are different than for LSD. Its color can be anywhere from slightly lighter in color than LSD or near colorless, to having slight shades of light pink, orange, yellow, and green.

Q: Does ULSD cost more than LSD?
A: Typically yes. The refining and distribution costs for ULSD are usually higher than LSD. There are also many other factors that can affect the price of ULSD.

Q: Do I need to use different fuel filters with ULSD?
A: No – you can continue to use the same fuel filters you used with LSD as long as they meet DDC specifications. Reference Detroit Diesel publication 7SE270 “Lubricating Oil, Fuel and Filters”. You should monitor your fuel filters closely during the transition from LSD to ULSD since ULSD has a cleaning effect on fuel system parts, and may temporarily cause shortened filter life.

Q: Does ULSD have any negative lubrication effects on fuel injection components such as injectors, especially in pre-2007 model year engines?
A: No. ULSD is safe to use in all Detroit Diesel on-highway engines. It has been formulated with the necessary additives to ensure that it does not harm fuel injection parts.

Q: Does ULSD have any long term negative effects on fuel system seals, especially in pre-2007 model year engines?
A: ULSD may have lower aromatic content than LSD. When switching from LSD to ULSD fuel, certain types of seals can shrink and develop small leaks in the form of seepage or drips. The chances of developing a leak depend on how many miles/hours are on the engine and the size of the change in aromatic content of the fuels. The seals used in all Detroit Diesel on-highway fuel systems are fully compatible when switching to ULSD except for two components on the Series 60® and one on the non-EGR MBE 4000. They are:

- The Series 60 Compu-Check valve mounted on top of the fuel pump (see Figure 3).
- An o-ring seal on the Series 60 fuel pump relief valve cap mounted on top of the fuel pump (see Figure 3).
- An o-ring seal on the non-EGR MBE 4000 fuel pump relief valve cap mounted on top of the fuel pump (see Figure 4).

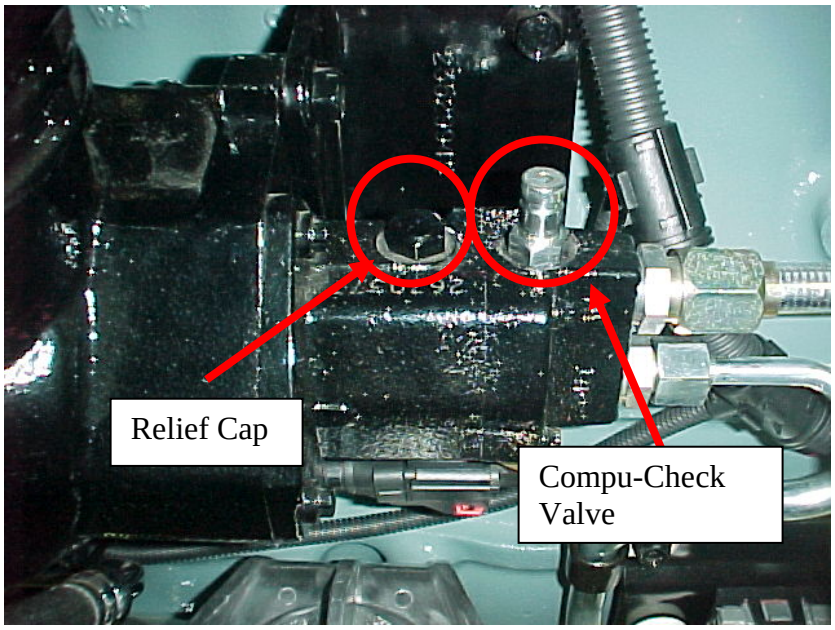

Figure 3 – S60 Compu-Check valve and relief valve cap

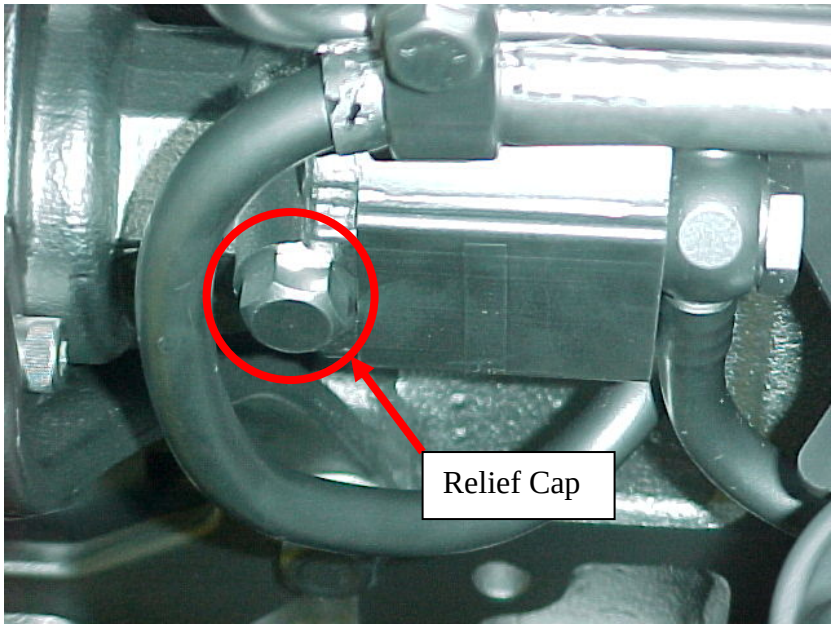

Figure 4 – MBE4000 (non-EGR) relief valve cap

Q: Is there anything a customer can do to reduce the chance of fuel system leaks?
A: No. Detroit Diesel is not recommending any specific customer action other than the regularly scheduled maintenance items as listed in the operators guide for the specific engine.

Q: What can be done to correct this problem?
A: Replacing the parts should cure the leak.

1. For leaks at the Compu-Check valve on the Series 60:
    a. Replace the valve or plug the hole with plug P/N: 23533540.
    b. Torque on the valve or plug is 19-21 Nm (14-15 lb-ft).
2. For leaks at the fuel pump relief valve cap on the Series 60, replace the pump.
3. For leaks at the fuel pump relief valve cap on the non-EGR MBE 4000, replace the pump.

Q: Will there be a Campaign or Modification for this problem?
A: No. Problems will be corrected on a fix-as-fail basis.

Q: Is there a safety concern with this type of fuel leak?
A: No. Any possible leak in these areas will be small and in the form of seepage or drips. While this is inconvenient, it is not enough to cause a safety concern. However, any fuel leak needs to be addressed at the earliest possible time.

Q: Will DDC pay the costs to repair a fuel leak?
A: If the Compu-Check valve or fuel pump relief cap leak after switching to ULSD, and the engine is under warranty or P3 (extended warranty), Detroit Diesel will cover the repair costs at an authorized repair outlet.

Q: Will there be a #1 ULSD for better cold weather performance?
A: Yes. Some major fuel suppliers are planning on offering a #1 ULSD. If you are interested in purchasing #1 ULSD, contact your local fuel supplier. Reference Detroit Diesel publication 7SE270 “Lubricating Oil, Fuel and Filters” for #1 ULSD specifications.

Q: What about certain engines such as Series 50 or two-stroke engines such as 6V92’s in transit bus applications programmed with a #1 fuel calibration. Will they be required to be reprogrammed because of ULSD?
A: No. If you are currently using #1 LSD on engines with a #1 fuel DDEC calibration, a comparable #1 ULSD should be available from your local fuel supplier. If you wish to switch to #2 ULSD with a #2 fuel DDEC calibration on a Series 50®, contact your local authorized service outlet for reprogramming of your ECU. Normal reprogramming fees will apply. If you wish to switch to a #2 fuel DDEC calibration on a 6V92 two-stroke engine, then you must do the following:

1. If the engine has a DDEC II ECU, it needs to be upgraded to a DDEC IV ECU with kit P/N: R23524199 (V-drive Left Hand Rotation) or R23524200 (T-drive Right Hand Rotation).
2. The DDEC mainframe must be changed to 6N4D-0445 and 6M4M-1269 before programming the DDEC IV ECU.
3. There is no reprogramming fee if the engine is being converted from DDEC II to DDEC IV by one of the kits noted in item #1. If the engine already has a DDEC IV ECU, then normal reprogramming fees will apply.
4. Contact MTU Detroit Diesel at 313-592-7000 if you have any questions regarding the two-stroke engines.

CONTACT INFORMATION
Please contact the DDC Customer Support Center at 313-592-5800 if you have any questions.