

IMPORTANT

THIS BOOKLET CONTAINS EMISSION CONTROL SYSTEMS MAINTENANCE AND WARRANTY INFORMATION THAT IS PROVIDED BY DETROIT IN COMPLIANCE WITH THE FEDERAL CLEAN AIR ACT.

IT ALSO PROVIDES THE DATE OF VEHICLE DELIVERY AND MILEAGE AT TIME OF DELIVERY. PLEASE KEEP THIS BOOKLET WITH THE VEHICLE AND MAKE IT AVAILABLE TO ANY AUTHORIZED DETROIT SERVICE LOCATION IF WARRANTY WORK IS REQUIRED.

**NOTICE TO PURCHASERS OF DD
PLATFORM ENGINES INSTALLED IN
VEHICLES SOLD OUTSIDE THE US.**

Vehicles sold outside the U.S. are equipped with odometers reading in kilometers. To convert warranty and maintenance mileage limitations to kilometers, refer to the table below.

Owner's Name _____

Engine Serial No. _____

Engine Model No. _____

Date of Delivery _____

Miles/Km at Delivery Date _____

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INTRODUCTION

An Important message to Detroit Diesel Product Owners...

This booklet contains emission control systems maintenance and warranty information that is provided by Detroit in compliance with the U.S. (Federal) Environmental Protection Agency, Emission Regulations under the Canada Motor Vehicle Safety Act in Canada, and the California Air Resources Board. An emission label is attached to the cylinder head cover, as required by law.

Also contained in this booklet is warranty information applicable to the product you have purchased.

LIMITED WARRANTY ON NEW DETROIT DD13, DD15, DD16, EPA10, GHG14, GHG17, HEAVY DUTY ENGINES USED IN ON-HIGHWAY VEHICLE APPLICATIONS

TERMS OF COVERAGE:

Uses

This warranty applies to the first retail purchaser and subsequent owners during the WARRANTY PERIOD of new Detroit Diesel DD13, DD15 and DD16, EPA10, GHG14 and GHG17 Engines (referred to as Engine) manufactured by Detroit Diesel and/or supplied by Detroit Diesel or Detroit Diesel of Canada Limited (which are collectively referred to as Detroit) for use in on-highway vehicle applications operated outside the United States and Canada.

Defects

This warranty covers Engine REPAIRS to correct any malfunction occurring during the WARRANTY PERIOD resulting from defects in material or workmanship.

Repairs

To obtain warranty repairs, you must request the needed repairs within the WARRANTY PERIOD from a Detroit Authorized Service Outlet. Only new genuine parts or remanufactured parts or components supplied or approved by Detroit will be used. Detroit may, at its discretion, replace rather than repair components. A reasonable time must be allowed to perform the warranty repair after taking the engine to the authorized service outlet. The owner is responsible for the percentage of repair costs shown in the warranty period chart. Repairs will be performed during normal business hours.

Warranty Period

The WARRANTY PERIOD begins on the date the engine is delivered to the first retail purchaser or put in use prior to sale at retail, whichever date occurs first, and ends at the time or mileage/kilometer limits shown in the WARRANTY PERIOD chart.

Like Replacement Engine

Engine(s) supplied by Detroit as a replacement for an engine still under warranty will assume the identity of the engine being replaced and be entitled to the remaining warranty coverage.

Service Supplies

The cost of service supplies such as coolant, oil and filters which are not reusable due to needed warranty repairs is covered by this warranty.

Engine Removal and Reinstallation

Reasonable labor costs for Engine removal and reinstallation, when necessary to make a warranty repair, are covered by this warranty.

Towing

During the base warranty period reasonable towing costs to the nearest authorized service outlet are covered by the warranty when due to a warrantable failure and the engine is either inoperable, cannot be safely operated or continued operation would cause further damage to the Product.

Aftertreatment System (ATS) Progressive Damage

Progressive damage to the ATS resulting from injector failure beyond 200,000 miles/320,000 kilometers but within 2 years will be covered by this warranty. Refer to the EMISSION CONTROL SYSTEM INFORMATION section in this Warranty Booklet for Aftertreatment System components.

WARRANTY PERIOD On-Highway Vehicle Applications				
Item	Warranty Limitations (Whichever Occurs First)		Repair Charge To Be Paid By Owner	
	MONTHS	MILES/km	PARTS	LABOR
Engine	0-24	Unlimited	No Charge	No Charge
Emissions	0-60	0-100,000 mi 0-160,000 km Unlimited mileage from 0-24 months	No Charge	No Charge
Emissions Warranty: Refer to the EMISSION CONTROL SYSTEM INFORMATION section in this Warranty Booklet for included components.				
Accessories	0-24	0-100,000 mi 0-160,000 km	No Charge	No Charge
*Major Components	25-60	0-500,000 mi 0-800,000 km	No Charge	100% of service outlet's normal charge

**Cylinder Block/Head, Crankshaft, Main Bearing Bolts, Flywheel Housing, Connecting Rod Assemblies, Oil Coolant Module Casting, Water Pump Housing and Air Inlet Housing.*

THIS WARRANTY DOES NOT COVER

Repairs Due to Accidents, Misuse, Storage Damage, Negligence or Certain Modifications

Repairs due to an accident, misuse, misapplication, storage damage, negligence or modification exceeding Detroit specifications are not covered by this warranty.

Fuel Injectors After 200,000 Miles / 320,000 Kilometers

The repair or replacement of fuel injectors after 200,000 miles/320,000 kilometers of operation is not covered by this warranty.

Maintenance

Detroit is not responsible for the cost of maintenance or repairs due to lack of performance of required maintenance services as recommended by Detroit, or the failure to use fuel, oil, lubricants and coolant meeting Detroit recommended specifications. Performance of the required maintenance and use of proper fuel, oil, lubricants and coolant are the responsibility of the owner. Refer to the Engine Operator's Guide for details.

Incidental or Consequential Damages

Detroit is not responsible for incidental or consequential costs or expenses which the owner may incur as a result of a malfunction or failure covered by this warranty, such as communication expenses, meals, lodging, loss of use of the engine or vehicle ("downtime"), loss of time, inconvenience, cargo loss or damage, and other similar costs and expenses.

Other Limitations

The performance of REPAIRS is the exclusive Owner's remedy under this warranty. Detroit does not authorize any person to assume or create for it any other obligation or liability in connection with the engine or the accessories.

THIS WARRANTY AND THE EMISSION CONTROL SYSTEMS' WARRANTY ARE THE ONLY WARRANTIES APPLICABLE TO THE ENGINE AS USED IN ON-HIGHWAY VEHICLE APPLICATIONS. DETROIT MAKES NO OTHER WARRANTIES EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. DETROIT SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES AS DESCRIBED ABOVE.

Some states do not allow the limitation of how long this warranty may last or the limitation or exclusion of incidental or consequential damages, so the above may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which may vary from state to state.

LIMITED WARRANTY ON NEW DETROIT DD13, DD15, DD16, EPA10, GHG14, GHG17, HEAVY DUTY ENGINES USED IN FIRE TRUCK OR CRASH VEHICLE APPLICATIONS

TERMS OF COVERAGE:

Uses

This warranty applies to the first retail purchaser and subsequent owners during the WARRANTY PERIOD of new Detroit Diesel DD13, DD15 and DD16, EPA10, GHG14 and GHG17 Engines (referred to as Engine) manufactured by Detroit Diesel and/or supplied by Detroit Diesel or Detroit Diesel of Canada Limited (which are collectively referred to as Detroit) for use in on-highway vehicle applications operated outside the United States and Canada.

Defects

This warranty covers Engine REPAIRS to correct any malfunction occurring during the WARRANTY PERIOD resulting from defects in material or workmanship.

Repairs

To obtain warranty repairs, you must request the needed repairs within the WARRANTY PERIOD from a Detroit Authorized Service Outlet. Only new genuine parts or remanufactured parts or components supplied or approved by Detroit will be used. Detroit may, at its discretion, replace rather than repair components. A reasonable time must be allowed to perform the warranty repair after taking the engine to the authorized service outlet. The owner is responsible for the percentage of repair costs shown in the warranty period chart. Repairs will be performed during normal business hours.

Warranty Period

The WARRANTY PERIOD begins on the date the engine is delivered to the first retail purchaser or put in use prior to sale at retail, whichever date occurs first, and ends at the time or mileage/kilometer limits shown in the WARRANTY PERIOD chart.

Like Replacement Engine

Engine(s) supplied by Detroit as a replacement for an engine still under warranty will assume the identity of the engine being replaced and be entitled to the remaining warranty coverage.

Service Supplies

The cost of service supplies such as coolant, oil and filters which are not reusable due to needed warranty repairs is covered by this warranty.

Engine Removal and Reinstallation

Reasonable labor costs for Engine removal and reinstallation, when necessary to make a warranty repair, are covered by this warranty.

WARRANTY PERIOD
Fire Truck or Crash/Rescue Vehicle Applications

Item	Warranty Limitations (Whichever Occurs First)		Repair Charge To Be Paid By Owner	
	MONTHS	MILES/km	PARTS	LABOR
Engine	0-60	0-100,000 mi 0-160,000 km	No Charge	No Charge
**Aftertreatment System	0-60	0-100,000 mi 0-160,000 km	No Charge	No Charge
Accessories	0-24	0-100,000 mi 0-160,000 km	No Charge	No Charge

* Fire Commander warranty is two year/unlimited mileage.

** Diesel Oxidation Catalyst, Diesel Particulate Filter, SCR Catalyst, Aftertreatment Sensors, Aftertreatment Control Module, Def Pump, Def Metering Unit, Aftertreatment Wiring Harness, Def Injection Nozzle, Dosing Unit.

THIS WARRANTY DOES NOT COVER

Repairs Due to Accidents, Misuse, Storage Damage, Negligence or Certain Modifications

Repairs due to an accident, misuse, misapplication, storage damage, negligence or modification exceeding Detroit specifications are not covered by this warranty.

Maintenance

Detroit is not responsible for the cost of maintenance or repairs due to lack of performance of required maintenance services as recommended by Detroit, or the failure to use fuel, oil, lubricants and coolant meeting Detroit recommended specifications. Performance of the required maintenance and use of proper fuel, oil, lubricants and coolant are the responsibility of the owner. Refer to the Engine Operator's Guide for details.

Incidental or Consequential Damages

Detroit is not responsible for incidental or consequential costs or expenses which the owner may incur as a result of a malfunction or failure covered by this warranty, such as communication expenses, meals, lodging, loss of use of the engine or vehicle ("downtime"), loss of time, inconvenience, cargo loss or damage, and other similar costs and expenses.

Other Limitations

The performance of REPAIRS is the exclusive Owner's remedy under this warranty. Detroit does not authorize any person to assume or create for it any other obligation or liability in connection with the engine or the accessories.

THIS WARRANTY AND THE EMISSION CONTROL SYSTEMS WARRANTY ARE THE ONLY WARRANTIES APPLICABLE TO THE ENGINE AS USED IN FIRE TRUCK OR CRASH VEHICLE APPLICATIONS. DETROIT MAKES NO OTHER WARRANTIES EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. DETROIT SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES AS DESCRIBED ABOVE.

Some states do not allow the limitation of how long this warranty may last or the limitation or exclusion of incidental or consequential damages, so the above may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which may vary from state to state.

EMMISSION CONTROL SYSTEMS INFORMATION

FEDERAL EMISSION CONTROL SYSTEMS WARRANTY COVERING DETROIT ENGINES

Detroit warrants to the owners of Detroit, DD13, DD15 and DD16, EPA10, GHG14 and GHG17 Engines built with standard exhaust emissions components, that the engine (1) was designed, built and equipped so as to conform, at the time of sale, with applicable regulations of the U.S. (Federal) Environmental Protection Agency, Emission Regulations under the Canada Motor Vehicle Safety Act in Canada, and the California Air Resources Board and (2) is free from defects in material and workmanship which cause the engine to fail to conform with those regulations for a period of 100,000 miles or five years of engine operation, whichever occurs first, or the new product warranty, if the product warranty is longer.

The warranty period shall begin on the date the vehicle is delivered to the first retail purchaser or, if the vehicle is first placed in service as a demonstrator prior to sale at retail, on the date the vehicle is first placed in such service. Emission related defects in the genuine Detroit components listed below, including reasonable related diagnostic costs, are covered by this warranty.

WHAT IS COVERED

These components are covered by the above warranty. Some scheduled maintenance is required (refer to the Owner's Emission Control Maintenance Service Chart).

- Turbocharger
- Motor Control Module (MCM)
- EGR Cooler
- Camshaft Position Sensor
- Crankshaft Position Sensor
- Oil Temperature Sensor
- Intake Manifold Pressure Sensor
- Intake Manifold Temperature Sensor
- Fuel Temperature Sensor
- Coolant Temperature Sensors
- Intake Throttle Valve and Adaptor
- Delta P Sensor
- Fuel Injector
- EGR Valve and Actuator
- Charge Air Cooler Outlet Sensor
- High Pressure Fuel Pump
- Turbo Speed Sensor
- Fuel Rail Pressure Sensor
- Fuel Pressure Sensor (Low)

The Aftertreatment System: The Aftertreatment System (ATS) will be covered under the base warranty period of the engine.

The Aftertreatment System:

- Intake Throttle Valve
 - Doser Block Assembly
 - Fuel Doser Valve
 - Oxidation Catalyst
 - Particulate Filter
 - DOC Inlet Temperature Sensor
 - DOC Outlet Temperature Sensor
 - DOC Inlet Pressure Sensor
 - DPF Outlet Pressure Sensor
 - DPF Outlet Temperature Sensor
 - ATD Wiring Harness
 - Aftertreatment Control Module (ACM)
 - * Exhaust Fluid Pump
 - SCR Catalyst
 - SCR Outlet Temperature Sensor
 - SCR Inlet and Outlet NOx Sensors
 - * Dosing Unit
 - * Metering Unit
 - Soot Sensor
- * DEF (Exhaust Fluid)

WHAT IS NOT COVERED

These components are covered by the above warranty. Some scheduled maintenance is required (refer to the Owner's Emission Control Maintenance Service Chart).

- Conditions resulting from tampering, misuse, improper adjustments, alteration, accident, failure to use recommended fuel or non-performance of required maintenance services;
- The replacement of non-warranted maintenance parts;
- Consequential damages such as loss of time, inconvenience, economic loss, loss of use of the engine or vehicle;
- Any engine in a vehicle on which odometer mileage has been changed so that the mileage cannot be readily determined;
- Periodic maintenance of the Particulate Filter.

DETROIT DIESEL CORPORATION DOES NOT AUTHORIZE ANY PERSON TO CREATE FOR IT ANY OTHER OBLIGATION OR LIABILITY IN CONNECTION WITH THESE SYSTEMS. THIS WARRANTY IS IN ADDITION TO THE NEW DETROIT ENGINE WARRANTY FOR ON-HIGHWAY VEHICLE APPLICATIONS.

CALIFORNIA EMISSION CONTROL SYSTEMS WARRANTY STATEMENT

YOUR WARRANTY RIGHTS AND OBLIGATIONS

The California Air Resources Board and Detroit are pleased to explain the emission control system warranty on your DD13, DD15 and DD16, EPA10, GHG14 and GHG17 engine. In California, new motor vehicles must be designed, built and equipped to meet the State's stringent anti-smog standards. Detroit must warrant the emission control system on your engine for the periods of time listed below provided there has been no abuse, neglect or improper maintenance of your engine.

Your emission control system may include parts such as the fuel injection system, the turbocharger and engine computer. Also included may be hoses, belts, connectors and other emission-related assemblies.

Where a warrantable condition exists, Detroit will repair your engine at no cost to you including diagnosis, parts and labor.

MANUFACTURER'S WARRANTY COVERAGE:

For a period of use of five (5) years or 100,000 miles or 3,000 hrs of operation, whichever occurs first:

1. If an emission-related part on your engine is defective, the part will be repaired or replaced by Detroit. This is your emission control system DEFECTS WARRANTY.

OWNER'S WARRANTY RESPONSIBILITIES:

These components are covered by the above warranty. Some scheduled maintenance is required (refer to the Owner's Emission Control Maintenance Service Chart).

- As the engine owner, you are responsible for performing the required maintenance listed in your owner's manual. Detroit recommends that you retain all receipts covering maintenance on your engine, but Detroit cannot deny warranty solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.
- You are responsible for presenting your engine to an Detroit Authorized Service Outlet as soon as a problem exists. The warranty repairs should be completed in a reasonable amount of time, not to exceed 30 days.
- As the engine owner, you should also be aware that Detroit may deny you warranty coverage if your engine or a part has failed due to abuse, neglect, improper maintenance or unauthorized modifications.

If you have any questions regarding your warranty rights and responsibilities, you should contact Manager Service Operations at (313) 592-5000 or the California Air Resources Board P.O. Box 8001, El Monte, CA 91731-2990.

DETROIT'S EMISSION CONTROL SYSTEM WARRANTY COVERED COMPONENTS

WHAT IS COVERED

These components are covered by the above warranty. Some scheduled maintenance is required (refer to the Owner's Emission Control Maintenance Service Chart).

- Turbocharger
- Motor Control Module (MCM)
- EGR Cooler
- Camshaft Position Sensor
- Crankshaft Position Sensor
- Oil Temperature Sensor
- Intake Manifold Pressure Sensor
- Intake Manifold Temperature Sensor
- Fuel Temperature Sensor
- Coolant Outlet Temperature Sensor
- Intake Throttle Valve and Adaptor
- Delta P Sensor
- Fuel Injector
- EGR Valve and Actuator
- Charge Air Cooler Outlet Sensor
- High Pressure Fuel Pump
- Turbo Speed Sensor
- Fuel Rail Pressure Sensor
- Fuel Pressure Sensor (Low)

Emergency Repair Contact

See Nearest Authorized Dealer/Distributor or call 1-800-445-1980

The Aftertreatment System: The Aftertreatment System (ATS) will be covered under the base warranty period of the engine.

The Aftertreatment System:

- Intake Throttle Valve
 - Doser Block Assembly
 - Fuel Doser Valve
 - Oxidation Catalyst
 - Particulate Filter
 - DOC Inlet Temperature Sensor
 - DOC Outlet Temperature Sensor
 - DOC Inlet Pressure Sensor
 - DPF Outlet Pressure Sensor
 - DPF Outlet Temperature Sensor
 - ATD Wiring Harness
 - Aftertreatment Control Module (ACM)
 - * Exhaust Fluid Pump
 - SCR Catalyst
 - SCR Outlet Temperature Sensor
 - SCR Inlet and Outlet NOx Sensors
 - * Dosing Unit
 - * Metering Unit
 - Soot Sensor
- * DEF (Exhaust Fluid)

WHAT IS NOT COVERED

- Conditions resulting from tampering, misuse, improper adjustments, alteration, accident, failure to use recommended fuel or non-performance of required maintenance services;
- The replacement of non-warranted maintenance parts;
- Consequential damages such as loss of time, inconvenience, economic loss, loss of use of the engine or vehicle;
- Any engine in a vehicle on which odometer mileage has been changed so that the mileage cannot be readily determined;
- Periodic maintenance of the Particulate Filter

DETROIT DIESEL CORPORATION DOES NOT AUTHORIZE ANY PERSON TO CREATE FOR IT ANY OTHER OBLIGATION OR LIABILITY IN CONNECTION WITH THESE SYSTEMS. THIS WARRANTY IS IN ADDITION TO THE NEW DETROIT ENGINE WARRANTY FOR ON-HIGHWAY VEHICLE APPLICATIONS.

THINGS YOU SHOULD KNOW ABOUT THE EMISSION CONTROL SYSTEMS' WARRANTY

REPLACEMENT PARTS

The emission control systems of your new Detroit Engine were designed, built and tested using Genuine Detroit Parts* and the engine is certified as being in conformity with applicable regulations of the U.S. (Federal) Environmental Protection Agency, Emission Regulations under the Canada Motor Vehicle Safety Act in Canada, and the California Air Resources Board. Accordingly, it is recommended that any replacement parts used for maintenance or for the repair of emission control systems be new, Genuine Detroit Parts.

THE WARRANTY OBLIGATIONS ARE NOT DEPENDENT UPON THE USE OF ANY PARTICULAR BRAND OF REPLACEMENT PARTS. THE OWNER MAY ELECT TO USE NON-GENUINE DETROIT PARTS FOR REPLACEMENT PURPOSES. USE OF REPLACEMENT PARTS WHICH ARE NOT OF EQUIVALENT QUALITY MAY IMPAIR THE EFFECTIVENESS OF EMISSION CONTROL SYSTEMS.

If other than Genuine Detroit Parts are used for maintenance replacements or for the repair of components affecting emission controls, the owner should assure himself/herself that such parts are warranted by their manufacturer to be equivalent to Genuine Detroit Parts in performance and durability.

MAINTENANCE AND REPAIRS

MAINTENANCE AND REPAIRS CAN BE PERFORMED BY ANY QUALIFIED SERVICE OUTLET; HOWEVER, WARRANTY REPAIRS MUST BE PERFORMED BY AN AUTHORIZED DETROIT SERVICE OUTLET. Receipts covering the performance of regular maintenance should be retained in the event questions arise concerning maintenance. These receipts should be transferred to each subsequent owner of this vehicle. Detroit reserves the right to deny warranty coverage if the required maintenance has not been performed. However, this decision would not be based solely on the absence of maintenance records.

Repairs covered by this warranty will be made at no charge by a Detroit Authorized Service Outlet. If in an emergency situation it is necessary to have repairs performed by other than a Detroit Authorized Service Outlet because an authorized outlet is not reasonably available, repairs may be performed at any available service establishment or by the owner, using any equivalent replacement part. Detroit will reimburse the owner for expenses (including diagnosis), not to exceed Detroit's suggested retail price for all warranted parts replaced and labor charges based on Detroit's recommended time allowance for warranty repair and the geographically appropriate hourly labor rate. A part not being available within 30 days or a repair not being complete within 30 days constitutes an emergency. For reimbursement of the repairs that were performed, take the replaced parts and receipt to a Detroit Authorized Service Outlet for reimbursement consideration.

**"GENUINE DETROIT PARTS" when used in connection with Detroit Engines, means parts manufactured by or for Detroit, designed for use on Detroit Engines and distributed by Detroit . This definition includes remanufactured assemblies designated reliable and sold by authorized Detroit Distributors that may be used in performing warranty repairs.*

U.S. CLEAN AIR ACT

The U.S. Clean Air Act requires the engine manufacturer to furnish, with each new engine to be installed in a motor vehicle, written instructions for proper maintenance and use of the vehicle or engine by the ultimate purchaser. The instructions shall correspond to regulations which the Administrator of the Environmental Protection Agency (EPA) shall promulgate. This booklet provides these instructions to owners in compliance with the law..

NORMAL ENGINE USE

The owner's maintenance instructions contained in this booklet are based on the assumption that the engine will be used to power a motor vehicle which will be used as designed:

- To carry passengers and/or cargo within the weight limitations indicated on the Vehicle Identification Number (VIN) affixed to the vehicle;
- To operate within legal operating limits;
- To operate on a daily basis, as a general rule, for at least several miles, and;
- To operate on specified fuel and lubricating oils as covered in the Operator's Manual

Unusual operating conditions will require more frequent engine maintenance as specified in the Section "Explanation of Owner's Emission Control Maintenance Services."

EXPLANATION OF OWNER'S MAINTENANCE SERVICES

1. **ENGINE LUBRICATING OIL:** Reference the Maintenance Service Charts in this booklet. Please go to DTNAConnect for a list of approved engine lubricating oils and refer to the Lubricating Oil, Fuel, and Filters brochure (DDC-SVC-BRO-0001) for service information.
2. **ENGINE LUBRICATING OIL FILTERS:** Reference the Maintenance Service Charts in this booklet.
3. **COOLANT:** Check the coolant level daily before starting the engine. Make sure coolant is up to the proper level. Add coolant as necessary. **DO NOT OVERFILL.** Check all cooling system lines and hoses for damage, leaks or loose connections. Tighten or replace as necessary. (Refer to Coolant Selections for Detroit Engines – DDC-SVC-BRO-0002). Please reference DTNAConnect for a list of approved engine coolants.
4. **FUEL FILTERS:** Reference the Maintenance Service Charts in this booklet.
5. **DRY TYPE AIR CLEANER:** Under no operating condition should the intake restriction exceed 20 inches of water at full load and rated speed. A clogged air cleaner element will cause excessive intake restriction and a reduced air supply to the engine. For equivalent restriction limits for lower speed, refer to Detroit Corporation Engineering Bulletin No. 39, "Air Cleaner Systems for Detroit Engines." If the dry type air cleaner is equipped with an aspirator, check for aspirator damage or clogging. Clean and repair as necessary.
6. **TURBOCHARGER:** Inspect turbocharger mountings, air intake and exhaust ducts for leaks. Check the oil inlet and outlet lines and connections for leaks and for restrictions to oil flow. Check for unusual vibration or noises. If excessive, remove the unit from service and have cause corrected.

- *An emission control service.*

7. **AFTERTREATMENT DEVICE (ATD):** Under no operating conditions should the exhaust back pressure ahead of the particulate filter exceed 8.86" Hg (30kPa). At this level of back pressure, the Amber Warning Lamp (AWL) will be illuminated and a SPN 3720 Code will be set in the engine Motor Control Module (MCM). A clogged Particulate filter element will restrict air flow through the engine. Reference the Maintenance Service Charts in this booklet.
8. **PARTICULATE FILTER:** A "Check Engine Light" will illuminate when ash requires removal. Reference the Maintenance Service Charts in this booklet.
9. **DEF PUMP FILTER:** Reference the Maintenance Service Charts in this booklet for required replacement.
10. **VALVE LASH ADJUSTMENT:** Reference the Maintenance Service Charts in this booklet.

- *An emission control service.*

OWNER'S EMISSION CONTROL MAINTENANCE SERVICE CHARTS

DFS 93K222(CK-4) and DFS 93K223(FA-4) Oil Service Interval Definitions (applies to the following tables):

Refer to DTNAConnect for the most current information.

Efficient Long Haul (over-the-road transport) service applies to vehicles that annually travel more than 60,000 miles (96,000 kilometers) and average greater than 7 miles per gallon with minimal city stop-and-go operation and minimum idle.

Long Haul (over-the-road transport) service applies to vehicles that annually travel more than 60,000 miles (96,000 kilometers) and average between 6.0 and 6.9 miles per gallon with minimal city stop-and-go operation.

Short Haul service applies to vehicles that annually travel up to 30,000-60,000 miles (48,000-96,000 kilometers) and average between 5.1 and 5.9 miles per gallon

Severe service applies to vehicles that annually travel up to 30,000 miles (48,000 kilometers) or average less than 5 miles per gallon or that operate under severe conditions. Severe service also applies to RV applications. Only one of these conditions needs to be met to categorize an application as Severe Service.

DD13: Maintenance Intervals with ULSD Fuel

**EPA10/GHG14/GHG17 Using DFS 93K222(CK-4) or 93K223(FA-4) Approved Oils
EPA07 Using DFS 93K222(CK-4) Approved Oils**

Component	Efficient Long Haul† (7.0 or better MPG)***	Long Haul† (6.0-6.9 MPG)***	Short Haul† (5.1-5.9 MPG)***	Severe† (Up to 5.0 MPG)***
Oil Filter	Replace every 65,000 mi (105,000 km)	Replace every 55,000 mi (89,000 km)	Replace every 40,000 mi (64,000 km) or 1000 hours	Replace every 35,000 mi (56,000 km) or 750 hours
Lubricating Oil	Replace every 65,000 mi (105,000 km)	Replace every 55,000 mi (89,000 km)	Replace every 40,000 mi (64,000 km) or 1000 hours	Replace every 35,000 mi (56,000 km) or 750 hours
Engine Fuel Filter*	Replace every 65,000 mi (105,000 km)	Replace every 55,000 mi (89,000 km)	Replace every 40,000 mi (64,000 km) or 1000 hours	Replace every 35,000 mi (56,000 km) or 750 hours
Engine Fuel Filter* w/ Frame-Mounted Filter	Replace every 100,000 mi (161,000 km)	Replace every 100,000 mi (161,000 km)	Replace every 80,000 mi (128,000 km) or 1000 hours	Replace every 70,000 mi (113,000 km) or 750 hours
Frame Mounted Fuel Filters‡	Replace every 65,000 mi (105,000 km)	Replace every 55,000 mi (89,000 km)	Replace every 40,000 mi (64,000 km) or 1000 hours	Replace every 35,000 mi (56,000 km) or 750 hours
Valve Lash Adjustment	Adjust at 100,000 mi (160,000 km), at 500,000 mi (800,000 km), and then every 500,000 mi (800,000 km) thereafter.			
Coolant - Standard Life	Maintain every 65,000 mi (105,000 km) Replace every 300,000 mi (482,000 km)	Maintain every 55,000 mi (89,000 km) Replace every 300,000 mi (482,000 km)	Maintain every 40,000 mi (64,000 km), 895 hrs or 1 year Replace every 300,000 mi (482,000 km)	Maintain every 35,000 mi (56,000 km) 640 hrs or 6 months Replace every 300,000 mi (482,000 km)
Coolant - Extended Life	Maintain every 130,000 mi (210,000 km) or 1 year Replace every 600,000 mi (965,000 km)	Maintain every 110,000 mi (178,000 km) or 1 year Replace every 600,000 mi (965,000 km)	Maintain every 80,000 mi (128,000 km) or 1 year Replace every 600,000 mi (965,000 km)	Maintain every 70,000 mi (112,000 km) or 1 year Replace every 600,000 mi (965,000 km)

Coolant System Filter (if equipped)	Current engine designs no longer use coolant filters. If you have a coolant filter, you may choose to remove the filter at your next maintenance interval. For more details reference bulletin 15TS-10Rev.			
Belts	Replace every 150,000 mi (240,000 km) 3845 hours	Replace every 150,000 mi (240,000 km) 3845 hours	Replace every 105,000 mi (165,000 km) 2690 hours	Replace every 105,000 mi (165,000 km) 2690 hours
Air System	Inspect at oil change	Inspect at oil change	Inspect at oil change	Inspect at oil change
Air Cleaner	Inspect at oil change	Inspect at oil change	Inspect at oil change	Inspect at oil change
Exhaust System	Inspect at oil change	Inspect at oil change	Inspect at oil change	Inspect at oil change
Air Compressor	Inspect at oil change	Inspect at oil change	Inspect at oil change	Inspect at oil change
Aftertreatment Devices	Inspect external hardware and connections every 6 months or at oil change intervals.†			
Diesel Particulate Filter EPA10 & GHG14	A Check Engine Light will illuminate when ash requires removal. Normal DPF ash clean intervals are 300,000 mi (480,000 km) 9,000 hours to 400,000 mi (640,000 km) 10,250 hours. Detroit highly recommends replacing the DPF with a Detroit™ genuine DPF to ensure maximum replacement life.			
Diesel Particulate Filter GHG17	A Check Engine Light will illuminate when ash requires removal. Normal DPF ash clean interval is 500,000 mi (800,000 km) 11,000 hours to 550,000 mi (880,000 km) 11,500 hours. Detroit highly recommends replacing the DPF with a Detroit™ genuine DPF to ensure maximum replacement life.			
DEF Pump Filter EPA10	Replace filter every 175,000 mi (280,000 km) or 3 years. †			
DEF Pump Yellow Filter GHG14	Replace filter every 175,000 mi (280,000 km) or 3 years. †			
DEF Pump White Filter GHG14 & GHG17	Replace filter every 500,000 mi (805,00 km) or 3 years. †			
DEF Pump Air Bladder	2010 Engines only: Refill bladder with air every 24 months.			
<ul style="list-style-type: none"> - †Whichever comes first. - *Engine fuel filters should be changed at recommended service intervals, or when the "Fuel Filter Service Lamp" activates on the dashboard. For maximum life of fuel system components, it is not recommended to exceed 100k mi on engine fuel filters under any condition. - ***Fuel Economy represents overall fuel economy (including idle time) - ‡Currently, only Detroit™ Fuel Filter/Water Separator & Davco 482/485/487 are the only frame-mounted filtration systems compatible for Detroit™ Engines. - Refer to "Routine Preventive Maintenance" or "How to Procedures" in the Engine Operator Manual for a description of all items. 				

DD15: Maintenance Intervals with ULSD Fuel

**EPA10/GHG14/GHG17 Using DFS 93K222(CK-4) or 93K223(FA-4) Approved Oils
EPA 07 Using DFS 93K222(CK-4) Approved Oils**

Component	Efficient Long Haul (7.0 or better MPG)***	Long Haul (6.0-6.9 MPG)***	Short Haul† (5.1-5.9 MPG)***	Severe† (Up to 5.0 MPG)***
Oil Filter	Replace every 75,000 miles (121,000 km)	Replace every 60,000 mi (97,000 km)	Replace every 45,000 mi (72,000 km) or 1000 hours	Replace every 35,000 mi (56,000 km) or 750 hours
Lubricating Oil	Replace every 75,000 miles (121,000 km)	Replace every 60,000 mi (97,000 km)	Replace every 45,000 mi (72,000 km) or 1000 hours	Replace every 35,000 mi (56,000 km) or 750 hours
Engine Fuel Filter*	Replace every 75,000 miles (121,000 km)	Replace every 60,000 mi (97,000 km)	Replace every 45,000 mi (72,000 km) or 1000 hours	Replace every 35,000 mi (56,000 km) or 750 hours
Engine Fuel Filter* w/ Frame-Mounted Filter	Replace every 100,000 mi (161,000 km)	Replace every 100,000 mi (161,000 km)	Replace every 90,000 mi (144,000 km) or 1000 hours	Replace every 70,000 mi (113,000 km) or 750 hours
Frame Mounted Fuel Filters‡	Replace every 75,000 miles (121,000 km)	Replace every 60,000 mi (97,000 km)	Replace every 45,000 mi (72,000 km) or 1000 hours	Replace every 35,000 mi (56,000 km) or 750 hours
Valve Lash Adjustment	Adjust at 100,000 mi (160,000 km), at 500,000 mi (800,000 km), and then every 500,000 mi (800,000 km) thereafter.			
Coolant - Standard Life	Maintain every 75,000 mi (121,000 km) Replace every 300,000 mi (482,000 km)	Maintain every 60,000 mi (97,000 km) or 1 year Replace every 300,000 mi (482,000 km)	Maintain every 45,000 mi (72,000 km), 895 hours or 1 year Replace every 300,000 mi (482,000 km)	Maintain every 35,000 mi (56,000 km), 640 hours or 6 months Replace every 300,000 mi (482,000 km)
Coolant - Extended Life	Maintain every 150,000 mi (242,000 km) or 1 year Replace every 600,000 mi (965,000 km)	Maintain every 120,000 mi (194,000 km) or 1 year Replace every 600,000 mi (965,000 km)	Maintain every 90,000 mi (144,000 km) or 1 year Replace every 600,000 mi (965,000 km)	Maintain every 70,000 mi (112,000 km) or 1 year Replace every 600,000 mi (965,000 km)
Coolant System Filter (if equipped)	Current engine designs no longer use coolant filters. If you have a coolant filter, you may choose to remove the filter at your next maintenance interval. For more details reference bulletin 15TS-10Rev.			

Belts	Replace every 150,000 mi (240,000 km) 3845 hours	Replace every 150,000 mi (240,000 km) 3845 hours	Replace every 105,000 mi (165,000 km) 2690 hours	Replace every 105,000 mi (165,000 km) 2690 hours
Air System	Inspect at oil change	Inspect at oil change	Inspect at oil change	Inspect at oil change
Air Cleaner	Inspect at oil change	Inspect at oil change	Inspect at oil change	Inspect at oil change
Exhaust System	Inspect at oil change	Inspect at oil change	Inspect at oil change	Inspect at oil change
Air Compressor	Inspect at oil change	Inspect at oil change	Inspect at oil change	Inspect at oil change
Aftertreatment Devices	Inspect external hardware and connections every 6 months or at oil change intervals.†			
Diesel Particulate Filter EPA10 & GHG14	A Check Engine Light will illuminate when ash requires removal. Normal DPF ash clean intervals are 300,000 mi (480,000 km) 9,000 hours to 400,000 mi (640,000 km) 10,250 hours. Detroit highly recommends replacing the DPF with a Detroit™ genuine DPF to ensure maximum replacement life.			
Diesel Particulate Filter GHG17	A Check Engine Light will illuminate when ash requires removal. Normal DPF ash clean interval is 500,000 mi (800,000 km) 11,000 hours to 550,000 mi (880,000 km) 11,500 hours. Detroit highly recommends replacing the DPF with a Detroit™ genuine DPF to ensure maximum replacement life.			
DEF Pump Filter EPA10	Replace filter every 175,000 mi (280,000 km) or 3 years. †			
DEF Pump Yellow Filter GHG14	Replace filter every 175,000 mi (280,000 km) or 3 years. †			
DEF Pump White Filter GHG14 & GHG17	Replace filter every 500,000 mi (805,000 km) or 3 years. †			
DEF Pump Air Bladder	2010 Engines only: Refill bladder with air every 24 months.			
<ul style="list-style-type: none"> - †Whichever comes first. - *Engine fuel filters should be changed at recommended service intervals, or when the "Fuel Filter Service Lamp" activates on the dashboard. For maximum life of fuel system components, it is not recommended to exceed 100k mi on engine fuel filters under any condition. - ***Fuel Economy represents overall fuel economy (including idle time) - ‡Currently, only Detroit™ Fuel Filter/Water Separator & Davco 482/485/487 are the only frame-mounted filtration systems compatible for Detroit™ Engines. - Refer to "Routine Preventive Maintenance" or "How to Procedures" in the Engine Operator Manual for a description of all items. 				

DD16: Maintenance Intervals with ULSD Fuel

**EPA10/GHG14/GHG17 Using DFS 93K222(CK-4) or 93K223(FA-4) Approved Oils
EPA 07 Using DFS 93K222(CK-4) Approved Oils**

Component	Efficient Long Haul (7.0 or better MPG)***	Long Haul (6.0-6.9 MPG)***	Short Haul† (5.1-5.9 MPG)***	Severe‡ (Up to 5.0 MPG)***
Oil Filter	Not Applicable	Replace every 55,000 mi (89,000 km)	Replace every 40,000 mi (64,000 km) or 1000 hrs	Replace every 35,000 mi (56,000 km) or 750 hrs
Lubricating Oil	Not Applicable	Replace every 55,000 mi (89,000 km)	Replace every 40,000 mi (64,000 km) or 1000 hrs	Replace every 35,000 mi (56,000 km) or 750 hrs
Engine Fuel Filter*	Not Applicable	Replace every 55,000 mi (89,000 km)	Replace every 40,000 mi (64,000 km) or 1000 hrs	Replace every 35,000 mi (56,000 km) or 750 hrs
Engine Fuel Filter* w/ Frame-Mounted Filter	Not Applicable	100,000 mi (161,000 km)	80,000 mi (128,000 km) or 1000 hrs	70,000 mi (113,000 km) or 750 hrs
Frame Mounted Fuel Filters‡	Not Applicable	Replace every 55,000 mi (89,000 km)	Replace every 40,000 mi (64,000 km) or 1000 hrs	Replace every 35,000 mi (56,000 km) or 750 hrs
Valve Lash Adjustment	Adjust at 100,000 mi (160,000 km), at 500,000 mi (800,000 km), and then every 500,000 mi (800,000 km) thereafter.			
Coolant - Standard Life	Not Applicable	Maintain every 55,000 mi (89,000 km) or 1 yr Replace every 300,000 mi (482,000 km)	Maintain every 40,000 mi (64,000 km), 895 hrs or 1 yr Replace every 300,000 mi (482,000 km)	Maintain every 35,000 mi (56,000 km), 640 hrs or 6 months Replace every 300,000 mi (482,000 km)
Coolant - Extended Life	Not Applicable	Maintain every 110,000 mi (178,000 km) or 1 year Replace every 600,000 mi (965,000 km)	Maintain every 80,000 mi (128,000 km) or 1 year Replace every 600,000 mi (965,000 km)	Maintain every 70,000 mi (112,000 km) or 1 year Replace every 600,000 mi (965,000 km)
Coolant System Filter (if equipped)	Current engine designs no longer use coolant filters. If you have a coolant filter, you may choose to remove the filter at your next maintenance interval. For more details reference bulletin 15TS-10Rev.			

Belts	Not Applicable	Replace every 150,000 mi (240,000 km) 3845 hrs	Replace every 105,000 mi (165,000 km) 2690 hrs	Replace every 105,000 mi (165,000 km) 2690 hrs
Air System	Not Applicable	Inspect at oil change	Inspect at oil change	Inspect at oil change
Air Cleaner	Not Applicable	Inspect at oil change	Inspect at oil change	Inspect at oil change
Exhaust System	Not Applicable	Inspect at oil change	Inspect at oil change	Inspect at oil change
Air Compressor	Not Applicable	Inspect at oil change	Inspect at oil change	Inspect at oil change
Aftertreatment Devices	Inspect external hardware and connections every 6 months or at oil change intervals.†			
Diesel Particulate Filter EPA10 & GHG14	A Check Engine Light will illuminate when ash requires removal. Normal DPF ash clean intervals are 300,000 mi (480,000 km) 9,000 hrs to 400,000 mi (640,000 km) 10,250 hrs. Detroit highly recommends replacing the DPF with a Detroit™ genuine DPF to ensure maximum replacement life.			
Diesel Particulate Filter GHG17	A Check Engine Light will illuminate when ash requires removal. Normal DPF ash clean interval is 500,000 mi (800,000 km) 11,000 hrs to 550,000 mi (880,000 km) 11,500 hrs. Detroit highly recommends replacing the DPF with a Detroit™ genuine DPF to ensure maximum replacement life.			
DEF Pump Filter EPA10	Replace filter every 175,000 mi (280,000 km) or 3 years. †			
DEF Pump Yellow Filter GHG14	Replace filter every 175,000 mi (280,000 km) or 3 years. †			
DEF Pump White Filter GHG14 & GHG17	Replace filter every 500,000 mi (805,00 km) or 3 years. †			
DEF Pump Air Bladder	2010 Engines only: Refill bladder with air every 24 months.			
<ul style="list-style-type: none"> - †Whichever comes first. - *Engine fuel filters should be changed at recommended service intervals, or when the "Fuel Filter Service Lamp" activates on the dashboard. For maximum life of fuel system components, it is not recommended to exceed 100k mi on engine fuel filters under any condition. - ***Fuel Economy represents overall fuel economy (including idle time) - ‡Currently, only Detroit™ Fuel Filter/Water Separator & Davco 482/485/487 are the only frame-mounted filtration systems compatible for Detroit™ Engines. - Refer to "Routine Preventive Maintenance" or "How to Procedures" in the Engine Operator Manual for a description of all items. 				

Recreational Vehicles (DD13 only): EPA10/GHG14/GHG17 Maintenance Intervals	
EPA10/GHG14/GHG17 Using DFS 93K222(CK-4) or 93K223(FA-4) Approved Oils EPA07 Using DFS 93K222(CK-4) Approved Oils	
Component	Intervals†
Oil Filter	Replace every 35,000 mi (56,000 km) or 750 hrs
Lubricating Oil	Replace every 35,000 mi (56,000 km) or 750 hrs
Engine Fuel Filter*	Replace every 35,000 mi (56,000 km) or 750 hrs
Engine Fuel Filter* w/ Frame-Mounted Filter	Replace every 70,000 mi (113,000 km) or 750 hrs
Frame Mounted Fuel Filters‡	Replace every 35,000 mi (56,000 km) or 750 hrs
Valve Lash Adjustment	Adjust at 100,000 mi (160,000 km), at 500,000 mi (800,000 km), and then every 500,000 mi (800,000 km) thereafter.
Coolant - Standard Life	Maintain every 35,000 mi (56,000 km), 640 hrs or 6 months Replace every 300,000 mi (482,000 km)
Coolant - Extended Life	Maintain every 70,000 mi (112,000 km) or 1 year Replace every 600,000 mi (965,000 km)
Coolant System Filter (if equipped)	Current engine designs no longer use coolant filters. If you have a coolant filter, you may choose to remove the filter at your next maintenance interval. For more details reference bulletin 15TS-10Rev.
Belts	Replace every 105,000 mi (165,000 km) 2690 hrs
Air System	Inspect at oil change
Air Cleaner	Inspect at oil change
Exhaust System	Inspect at oil change
Air Compressor	Inspect at oil change
Aftertreatment Devices	Inspect external hardware and connections every 6 months or at oil change intervals.†

Diesel Particulate Filter EPA10 & GHG14	A Check Engine Light will illuminate when ash requires removal. Normal DPF ash clean intervals are 300,000 mi (480,000 km) 9,000 hrs to 400,000 mi (640,000 km) 10,250 hrs. Detroit highly recommends replacing the DPF with a Detroit™ genuine DPF to ensure maximum replacement life.
Diesel Particulate Filter GHG17	A Check Engine Light will illuminate when ash requires removal. Normal DPF ash clean interval is 500,000 mi (800,000 km) 11,000 hrs to 550,000 mi (880,000 km) 11,500 hrs. Detroit highly recommends replacing the DPF with a Detroit™ genuine DPF to ensure maximum replacement life.
DEF Pump Filter EPA10	Replace filter every 175,000 mi (280,000 km) or 3 years. †
DEF Pump Yellow Filter GHG14	Replace filter every 175,000 mi (280,000 km) or 3 years. †
DEF Pump White Filter GHG14 & GHG17	Replace filter every 500,000 mi (805,000 km) or 3 years. †
DEF Pump Air Bladder	2010 Engines only: Refill bladder with air every 24 months.
<ul style="list-style-type: none"> - †Whichever comes first. - *Engine fuel filters should be changed at recommended service intervals, or when the "Fuel Filter Service Lamp" activates on the dashboard. For maximum life of fuel system components, it is not recommended to exceed 100k mi on engine fuel filters under any condition. - ***Fuel Economy represents overall fuel economy (including idle time) - ‡Currently, only Detroit™ Fuel Filter/Water Separator & Davco 482/485/487 are the only frame-mounted filtration systems compatible for Detroit™ Engines. - Refer to "Routine Preventive Maintenance" or "How to Procedures" in the Engine Operator Manual for a description of all items. 	

**DFS 93K218(CJ-4) Oil Service Interval Definitions
(applies to the following tables):**

Severe service applies to vehicles that annually travel up to 48,000 kilometers (30,000 miles) and average less than 5 miles per gallon or that operate under severe conditions.

Short Haul service applies to vehicles that annually travel up to 48,000 to 96,000 kilometers (30,000 to 60,000 miles) and average between 5.1 and 5.9 miles per gallon.

Long Haul service (over-the-road transport) applies to vehicles that annually travel more than 96,000 kilometers (60,000 miles) and average greater than 6 miles per gallon with minimal city stop-and-go operation.

Note: CJ-4 oils are being phased out of the market and will be unavailable in the near future. The component intervals below are only listing intervals that have changed from the CK-4 table.

DD13/DD15/DD16: Maintenance Intervals with ULSD Fuel

EPA07/EPA10/GHG14/GHG17 Using DFS 93K218(CJ-4) Approved Oils

Component	Long Haul† (6.0 or better MPG)***	Short Haul† (5.1-5.9 MPG)***	Severe† (up to 5.0 MPG)***	Recreational Vehicles***
Oil Filter	Replace every 50,000 miles (80,000 km) or 1280 hrs	Replace every 35,000 miles (55,000 km) or 895 hrs	Replace every 25,000 miles (40,000 km) or 640 hrs	Replace every 25,000 miles (40,000 km) or 640 hrs
Lubricating Oil	Replace every 50,000 miles (80,000 km) or 1280 hrs	Replace every 35,000 miles (55,000 km) or 895 hrs	Replace every 25,000 miles (40,000 km) or 640 hrs	Replace every 25,000 miles (40,000 km) or 640 hrs
All other components	Refer to CK-4 table			

- †Whichever comes first.
- *Engine fuel filters should be changed at recommended service intervals, or when the "Fuel Filter Service Lamp" activates on the dashboard. For maximum life of fuel system components, it is not recommended to exceed 100k miles on engine fuel filters under any condition.
- ***Fuel Economy represents overall fuel economy (including idle time)
- ‡Currently, only Detroit™ Fuel Filter/Water Separator & Davco 482/485/487 are the only frame-mounted filtration systems compatible for Detroit™ Engines.
- Refer to "Routine Preventive Maintenance" or "How to Procedures" in the Engine Operator Manual for a description of all items.
- NOTE: Actual fuel filter life will vary based on fuel quality.
- NOTE: Diesel Oxidation Catalyst (DOC) and the SCR (Selective Catalytic Reduction) Catalyst do not require maintenance.

LUBRICATING OIL ANALYSIS – WARNING VALULES

Please refer to Lube Oil / Fuel / Filter Requirements booklet (DDC-SVC-BRO-0001) for the most current information regarding engine oils. This manual can be found on DTNAConnect.

BIODIESEL/BIOFUEL GENERAL RECOMMENDATIONS/GUIDELINES

Please Refer to DTNAConnect for the most current information regarding Biodiesel.

Detroit™ supports biodiesel as a renewable fuel. Biodiesel fuels are mono alkali esters of long chain fatty acids commonly referred to as Fatty Acid Methyl Esters (FAME) and are derived from renewable resources through a chemical process called transesterification. Detroit™ approves the use of biodiesel fuel blends as follows:

- DD Family of Engines - Biodiesel blends up to 5% are allowed

Detroit™ is responsible for the materials and workmanship of its engines. Failures attributed to the use of fuels which do not meet industry standards are not the fault of Detroit and will not be covered by Detroit product warranty. While Detroit supports the use of B5, the use of unacceptable quality fuel that does not meet industry standards can result in warranty evocation.

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.

Biofuel General Recommendations and Guidelines

Please Refer to DTNAConnect for the most current information regarding Biofuel.

POLICY ON OWNER SERVICE

MAINTENANCE SERVICES

Proper maintenance and care of the engine will help achieve lower overall operating costs. Use of recommended fuels and lubricants and regular maintenance performed by competent service personnel will help avoid conditions arising from neglect which are not covered by Detroit new product warranties. The maintenance services described in the applicable Operator's Guide should be performed at the time and/or mileage intervals stated, by an Authorized Detroit Service Outlet or any qualified service outlet.

PRODUCTION CHANGE

Detroit reserves the right to make change(s) in design or add improvement(s) on the products at any time without incurring any obligations to install same on products previously purchased. Authorized Service Outlets reserve a similar right.

WARRANTY REPAIR ORDER

For the owner's records, the Authorized Service Outlet will provide a copy of the warranty repair order listing all warranty repairs performed.

FUEL ADDITIVES

Detroit™ engines are designed to operate satisfactorily on a wide range of diesel fuels. The regular use of aftermarket fuel additives is not required or recommended due to potential fuel injector system or engine damage. Our experience has been that such additives increase operating costs without providing benefit. Aftermarket fuel additive supplements available at most retail stores are intended to be added to the fuel by the customer. These include a variety of independently marketed products which claim to be:

- Cold Flow Improvers (prevents fuel jelling). Lower CFPP (help prevent fuel filter plugging)
- Biocide
- Fuel injection system deposit cleaners or removers
- Oxidative stability
- Cetane Improvers (booster)
- Emission Control Additives
- Fuel Economy
- Smoke Suppressants
- Detergents
- Combustion Improvers
- Icing preventers

Detroit™ recognizes some of the above listed additives may be beneficial in addressing temporary fuel quality issues, but they should not replace proper fuel selection and handling as described in the above sections of the brochure.

Should a customer decide that a supplemental additive is temporarily required; the following is intended to provide guidance to the customer in selecting and additive partner, evaluating potential safety hazards and deleterious engine effects.

- Choose a fuel additive company with strong technical support both in both the field and laboratory. Fuel additive companies should be able to test your fuel and show that it is deficient in some way and be able to demonstrate that their product fixes the finding (s). Companies such as Afton, Infineum, Innospec, and Lubrizol may be considered. Alternately, choose an additive supplier that works closely with these companies.
- Review a Material Safety Data Sheet (MSDS) or a Technical Product Bulletin carefully for special handling instructions and hazardous material content.
- Get a detailed compositional analysis from the supplier. Ash forming metallic elements and corrosive elements must not be present. Additives containing calcium, barium, zinc, phosphorous, sodium, magnesium, iron, copper, and manganese are known to cause combustion ash deposits that can foul fuel injectors and create deposits which may adversely affect cylinder life. Halogenated compounds containing chloride, fluoride, and bromide are corrosive, as are some sulfur containing compounds. Avoid the use of

additives with these components. Also, avoid language that says all in one products.

- Be sure to ask your additive supplier to explain the proper handling, mixing, and storage of the additive(s). Be sure to follow all recommendations made by the additive supplier. Improper mixing and storage can negatively affect the performance characteristics of any additive.
- Many additives act as surfactants; evaluate the effect of water separation characteristics on the fuel in combination with the additive. Refer to Table "Diesel Fuel Specifications" for performance requirements.
- Many commercial diesel fuels today contain performance additives, particularly those marketed as premium diesel fuel. Any supplemental additive being considered must be compatible with the fuel it is to be used in. Evaluate a mixture containing twice the recommended concentration of additive for compatibility to represent an over dosage condition, using the tests listed in Table "Diesel Fuel Specifications".
- Conduct performance evaluation of a fuel supplemental additive in customer equipment for a minimum of six months. Testing should be a side-by-side comparison with and without the additive to verify performance claims. Testimonials do not guarantee similar performance in all applications.

The use of supplemental fuel additives does not necessarily void the engine warranty. However, warranty and repair expenses which are determined, by Detroit Diesel or its representative, to have resulted from a fuel additive will not be covered. Accompany these products with performance data supporting their merit as well as the manufacturer's warranty policy.

Detroit™ will not test or verify the performance of any aftermarket additives. It will not accept responsibility for the use, selection, or hazards relating to the use of such products.

WATER CONTAMINATION

- Water in diesel fuel leads to storage tank corrossions especially if it shows high alkalinity properties due to salt (such as Sodium),or if acidic properties arise from low molecular weight acids (such as formic and acetic acid) contamination. It also promotes microbial growth at the water fuel interface (emulsions) if the fuel contains detergent additives. Good fuel handling practices including bulk tank filtration, regularly removing the water from the bottom of the storage tank and regular tank cleaning is the best practice to prevent any type of contaminations.
- The presence of sediment in fuel storage tank could cause filter plugging problems and the obstruction of fuel into the engine fuel injection systems.
- Sample water bottoms every six months (including microbial growth)
- Change filters every 3-6 months
- Recommended cleaning intervals for fuel tanks are every 2 to 5 years or as needed

Some fuel additives claim temporary benefit when fuel is contaminated with water. They are not intended to replace good fuel handling practices. Supplemental fuel additives designed to disperse, emulsify or carry the water through the fuel system should not be used, as they can disable or significantly

reduce the efficiency of fuel/water separators, resulting in fuel system corrosion and deposits. Since many fuel additives act as surfactants, their effect on the efficiency of fuel/water separators should be evaluated by ASTM D7261 test method, which is a quick measurement of roughly how much water passes through a coalescing filter in a single pass. Where water contamination is a concern, equip the fuel system with a fuel/water separator and service it regularly.

MICROBIAL CONTAMINATION.

Diesel fuel at the refinery location is mostly tolerant to microbial organisms (bacteria and fungi) because of the heating process applied during the production process. The problem with microbial contaminations arises as the fuel is released through the pipeline and reaches to terminals, retail stores and storage tanks.

The production of ULSD via hydro treating process has created some undesirable consequences to the diesel fuel supply chain. The following are some of the major factors contributing to the problems.

- ULSD fuel holds less water (more non-dissolved water). This event has made more free water at the bottom of the tank which allows microbial growth more favorable in the fuel.
- Reduction in aromatics content (aromatics were believed to act as effective biocide.)
- Reduction in sulfur (500-ppm to 15-ppm) has created more potential microbial growth. Again, Sulfur was believed to act as effective and potent biocide in the fuel tanks.
- Contaminants such as salts (sodium), organic acid and soaps can now reside at the bottom layer of the fuel (water) which potentially propagate the growth and reproduction of microorganism. The acidic or basic nature of the water layer drastically increases storage tank corrosion.

These undesirable and observable facts can cause several problems. The obvious relationship between microorganisms and performance is fuel filter plugging. The bio-slime (green-brown) can coat the filter and can eventually lead to fuel filter life reduction and fuel starvation.

In marine and other environments where microbe growth is a problem, a biocide may be used. Microbial activity may be confirmed with commercially available test kits. When checking for microbial activity, collect fuel samples from the bottom of the fuel tank. Follow the manufacturer's instructions for treatment. Avoid the use of biocides containing chlorine, bromine, or fluorine compounds, since these may cause fuel system corrosion.

FUEL ADDITIVES THAT ARE NOT ALLOWED

The following fuel additives are **NOT** allowed:



CAUTION:

USED ENGINE OIL: To avoid injury to skin from contact with the contaminants in used engine oil, wear protective gloves and apron.

- Used Lubricating Oil - Detroit™ specifically prohibits the use of drained lubricating oil in diesel fuel. Used lubricating oil contains combustion acids and particulate materials, which erode injector components, resulting in loss of power and increased exhaust emissions. In addition, the use of drained lubricating oil will increase maintenance requirements due to filter plugging and combustion deposits. Refer to section "Waste Oil Disposal and Re-Refined Oils" for recommendations on proper used oil disposal.
- Gasoline - The addition of gasoline to diesel fuel will create a serious fire hazard. The presence of gasoline in diesel fuel will reduce the fuel cetane number and increase combustion temperatures.
- Ethanol - The addition of ethanol to diesel fuel will create a serious fire hazard. The presence of ethanol in diesel fuel will reduce the fuel cetane number and increase combustion temperatures. Drain and clean tanks that contain such mixtures as soon as possible. Detroit™ will not be responsible for any detrimental effects which it determines resulted from the use of used lubricating oil, gasoline, or ethanol in diesel fuel.

OWNER'S WARRANTY RESPONSIBILITIES:

- Conduct performance evaluation of a fuel supplemental additive in customer equipment for a minimum of six months. Testing should be a side-by-side comparison with and without the additive to verify performance claims. Testimonials do not guarantee similar performance in all applications.

Supplemental fuel additives are not recommended due to potential injector system or engine damage. Our experience has been that such additives increase operating costs without providing benefit. The use of supplemental fuel additives does not necessarily void the engine warranty. However, repair expenses which result from fuel system or engine component malfunctions or damage attributed to their use will not be covered. Accompany these products with performance data supporting their merit as well as the manufacturer's warranty policy. Detroit Diesel will not test or verify the performance of any supplemental additives and will not accept responsibility for use, selection, or hazards relating to the use of such products.

CUSTOMER ASSISTANCE PROCEDURE

Detroit has established a two-step procedure which customers should follow when experiencing a problem with any Detroit product or Part. Detroit fully realizes that ultimately the customer's concerns will be resolved at the Distributor/Dealer level and therefore encourages customers to follow the procedure outlined below:

Step One

Customers should discuss the problem with member(s) of management from the Authorized Service Outlet. Frequently, complaints are the result of a breakdown in communication and can quickly be resolved by a member of management. If they have already discussed the problem with the Distributor or Dealer's Sales or Service Manager, they should contact the General Manager.

Step Two

If you are still not satisfied, present the entire matter in writing or by phone to:

Warranty Manager

Detroit

13400 Outer Drive, West

Detroit, Michigan 48239-4001

Phone: (313) 592-5000

Fax: (313) 592-5888

Website: www.demanddetroit.com

