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Introduction

California Proposition 65 Warning

WARNING: Engine exhaust, some of its constituents, and certain vehicle components contain or emit chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Certain fluids contained in vehicles and certain products of components contain or emit chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Your new Diesel engine will feel, drive and function somewhat differently than a gasoline engine. Therefore it is very important that you read and thoroughly familiarize yourself and others operating the vehicle with this guide.

This guide will acquaint you with the 6.0L Power Stroke Diesel engine. It provides recommendations on engine care and operating procedures. For complete vehicle information, also refer to the Owner Guide included with the vehicle. It also describes equipment and gives specifications for equipment that was in effect when this guide was approved for printing, and should be considered a permanent part of the vehicle.

Some aftermarket products may cause severe engine and/or transmission damage. There are various manufacturers offering devices to increase turbocharger boost, exhaust brakes to increase stopping/hauling capacity or other such devices to increase the power/torque of the Power Stroke engine. Many owners' past experience with these products has been very poor. Severe powertrain damage may result from the use of these aftermarket products which will not be covered by the Ford warranty.

Ford may discontinue models or change specifications without any notice and without incurring obligations.

Introduction

IMPORTANT NOTICE

Ford vehicles are suitable for producing ambulances only if equipped with the *Ford Ambulance Preparation Package.* In addition, Ford urges ambulance manufacturers to follow the recommendation of the *Ford Incomplete Vehicle Manual, Ford Truck Body Builder's Layout Book* (and pertinent supplements) and the *Qualified Vehicle Modifiers Guidelines*. Using a Ford vehicle without the *Ford Ambulance Preparation Package* to produce an ambulance voids the Ford warranty and could result in elevated underbody temperatures, fuel overpressurization and the risk of fuel expulsion and fires. To determine whether the vehicle is equipped with the *Ford Ambulance Preparation Package,* inspect the information plate on the driver's side door pillar. Contact the manufacturer of your vehicle to determine whether the ambulance manufacturer's followed Ford's recommendations.

WARNINGS

Throughout this guide, you will find warnings. Warnings remind you to be especially careful to avoid personal injury.

NEW VEHICLE BREAK-IN

Your vehicle does not need an extensive break-in. Try not to drive continuously at the same speed for the first 1,600 km (1,000 miles) of new vehicle operation. Vary your speed to allow parts to adjust themselves to other parts.

Drive your new vehicle at least 800 km (500 miles) before towing a trailer.

Do not add friction modifier compounds or special break-in oils during the first few thousand kilometers (miles) of operation, since these additives may prevent piston ring seating. See *Engine oil* in the *General maintenance information* chapter for more information on oil usage.

Diesel information

DIESEL ENGINE INFORMATION

The Diesel engine fuel system consists of:

- an engine-mounted secondary fuel filter
- frame-mounted Horizontal Fuel Conditioner Module (HFCM)
- a unit injector for each cylinder

The HFCM acts as a primary fuel filter/water separator which removes both water and impurities from the fuel. The engine-mounted fuel filter and the HFCM filter should be changed at the recommended service interval. Refer to the *Scheduled maintenance guide* section of this manual for more information.

The HFCM should be drained at regular intervals or when the WATER IN FUEL light illuminates in the instrument cluster.

The fuel injectors are located in the center of the combustion chambers in the cylinder head between the rocker arm assemblies. The glow plug system and fuel injection system are controlled through the Powertrain Control Module (PCM) and Fuel Injection Control Module (FICM).

Fuel is drawn from the fuel tank by a frame-mounted electric fuel pump. The fuel pump provides pressurized fuel to the engine and is electronically controlled by the fuel pump PCM relay. The fuel pump contains a pressure relief valve for overpressure protection in the event of restricted flow.

Lubrication system

It is important to change the engine oil at the recommended service intervals, because oil viscosity is important in maintaining the oil pressure required to actuate the fuel injectors. Extended oil change intervals can negatively affect engine performance, fuel economy and engine life. Refer to the engine oil specification chart located under *Engine oil specifications* in the *General maintenance information* chapter.

Fast start glow plug system

The glow plug system consists of:

- eight glow plugs
- the glow plug control module (GPCM)
- engine oil temperature (EOT) sensor
- barometric pressure (BARO) sensor

The glow plug system is electronically controlled by the PCM. The GPCM energizes the glow plugs immediately after the ignition is placed in the ON position, then determines how long the glow plugs will be on according to the EOT and BARO sensors. The required time for the glow plugs to be energized decreases as the engine oil temperature and barometric pressure increase.

Engine cooling system

The cooling system contains an engine oil cooler which is mounted in the center valley of the engine. The cooler's function is to regulate engine oil temperature.

Engine governed speed

The engine governor is controlled by the PCM. The PCM controls fuel input to limit maximum engine speed. It will not, however, prevent engine overspeeding resulting from downshifting at high vehicle speed or by descending steep grades at too high a vehicle speed for the selected transmission gear.

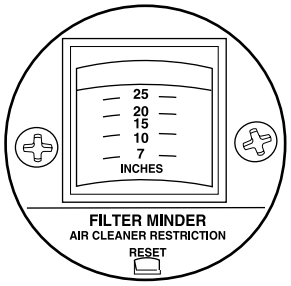
For maximum vehicle speed in various gears, refer to *Manual transmission shift speeds* in the *Driving tips* chapter. Do not exceed 3,600 rpm. Maximum engine governed speed is 4,000 rpm depending on engine load. Excessive rpm can only be achieved by manually downshifting at too high of a vehicle speed.

Operating the engine beyond the governed speed can cause severe engine damage.

Diesel information

Air filter restriction gauge

The restriction gauge, located on the upper housing of the air cleaner assembly, monitors the condition of the air filter element in two ways:

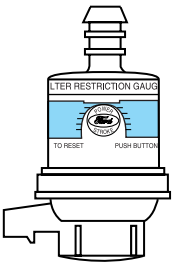


First, the colored indictor inside the gauge highlights the percentage that the air filter element is clogged with dust or contaminants. Refer to *Engine Compartment* in *Service Points* chapter.

Second, the gauge contains an electrical switch which illuminates a warning light on the instrument cluster when the air filter element is 100% clogged. Refer to the *Warning lights* chapter.

Check the air filter restriction gauge whenever the hood is raised to perform general engine maintenance. If the vehicle is operated in extremely dusty conditions, check the gauge at least every 800 km (500 miles), or two weeks, whichever comes first.

The air filter element must be replaced when the colored band on the gauge reaches the CHANGE FILTER mark. Engine performance and fuel economy are adversely affected when the maximum restriction is reached.

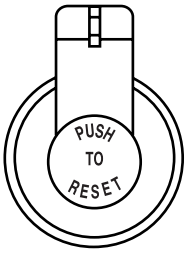


Blowing-out the air filter element with compressed air is not recommended as the compressed air may damage the filter paper.

Note: It is not possible to determine the level of filter clogging by visual appearance alone. A filter which appears to be dirty may actually have several thousand kilometers (miles) of life remaining.

Always use the underhood air filter restriction gauge or engine air filter warning light on the instrument cluster to determine when the air filter element needs to be changed.

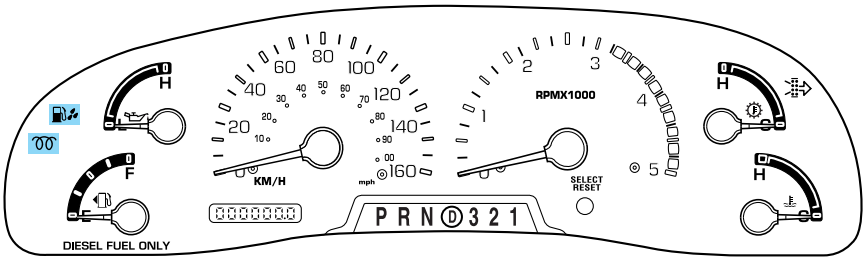
After servicing the air filter element, reset the restriction gauge by pressing the button on the end of the gauge.



Note: If the vehicle is operated in a heavy snow storm, in blowing snow or the vehicle is equipped with a snowplow, the engine air filter element may become partially clogged with snow and/or ice. If this occurs, the air filter restriction gauge will move to the CHANGE FILTER mark and the engine may experience a significant reduction in power output. The vehicle may be driven under these conditions for up to 400 km (250 miles) without damage to the engine or related components.

At the earliest opportunity, clear all snow and ice from the air induction system and replace the air filter element, or remove the element and dry it out. Reset the restriction gauge by pressing the button on the end of the gauge.

The air filter warning light on the instrument cluster may be used, in addition to the underhood restriction gauge, to monitor the condition of the air filter element. Refer to the *Warning lights* chapter.



WAIT TO START

With the key in the ON position, the

WAIT TO START light will illuminate if glow plug heat is necessary as a starting aid. Wait until the light goes off before starting. The light should always illuminate briefly, when the ignition key is in the ON position. If the light does not illuminate, there may be a problem. Refer to the *Starting* chapter in this guide. After the engine starts, the light should remain off.

WATER IN FUEL

During refueling, it is possible for

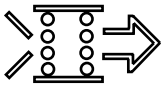
water-contaminated diesel fuel to be pumped into your tank. Your vehicle fuel system is equipped with an HFCM to remove water from the fuel. The WATER IN FUEL light will illuminate when the ignition is turned to START (as part of the light function check) and when the HFCM has a significant quantity of water in it.

If the light illuminates when the engine is running, stop the vehicle as soon as safely possible, shut off the engine, then drain the HFCM. Refer to the *General maintenance information* chapter for drain procedure. Allowing water to stay in the system could result in extensive damage to, or failure of, the fuel injection system.

Do not drain the HFCM while the engine is running. Fuel may ignite if the separator is drained while the engine is running or the vehicle is moving.

ENGINE AIR FILTER

The engine air filter warning light illuminates when the air filter restriction gauge reaches the CHANGE FILTER mark.



The vehicle may be driven with the engine air filter warning light illuminated for up to 400 km (250 miles) without damaging the engine or related components. However, the air filter element **must** be replaced at the earliest opportunity. Refer to *Air filter restriction gauge* in the *Diesel information* chapter for more information.

STARTING THE ENGINE

Read all starting instructions carefully before you start your vehicle.

For temperatures below 0°C (32°F), the use of the correct grade engine oil is essential for proper operation.

If your vehicle is equipped with a manual transmission, make sure the parking brake is set fully before you turn the key. Depress the clutch pedal and place the gearshift in the neutral position. The clutch must be fully depressed in order to operate the starter. Do not press the accelerator during starting.

If your vehicle is equipped with an automatic transmission, ensure the gearshift lever is in P (Park) and the parking brake is set before you turn the key. Do not press the accelerator during starting.

COLD WEATHER STARTING

Do not crank the engine for more than 30 seconds at a time as starter damage may occur. If the engine fails to start, turn the key to OFF and wait 30 seconds before trying again.

Do not use starting fluid such as ether in the air intake system (see Air Cleaner Decal). Such fluid could cause immediate explosive damage to the engine and possible personal injury.

Note: Do not add gasoline, gasohol or alcohol to Diesel fuel. This practice creates a serious fire hazard and causes engine performance problems.

1. Make sure all vehicle occupants have buckled their safety belts. For more information on safety belts and their proper usage, refer to *Seating and safety restraints* chapter in the owner guide.

2. Make sure the headlamps and vehicle accessories are off.

3. Turn the key to the ON position. When the WAIT TO START light goes off, turn the key to START. (For Canadian vehicles, the daytime running lamps will be on if the parking brake is not applied and the key is turned to ON.)

4. When the engine starts, release the key. The glow plugs will continue to be activated for up to two minutes after the WAIT TO START light turns off. If the engine is not started before the activation ceases, the glow plug system must be reset by turning the ignition key to OFF.

5. After the engine starts, allow it to idle for about 15 seconds. (Do not increase engine speed until the oil pressure gauge indicates normal pressure.)

STOPPING THE ENGINE

Turn the ignition to OFF. To prolong engine life (after extended high speed or maximum GVW operation), it is recommended that a hot engine be allowed to operate at low idle for about 7–10 minutes which would allow sufficient time for the turbocharged engine to cool down.

COLD WEATHER OPERATION

Changing to a lighter grade engine oil also makes starting easier under these conditions. Refer to *Engine oil specifications* in the *General maintenance information* chapter.

At temperatures below –7°C (20°F), Number 2–D Diesel fuel may thicken enough to clog the fuel filter. Your vehicle is equipped with an HFCM which acts as a fuel filter/heater/water separator to keep the wax melted which will help prevent fuel filter clogging. However, if the engine starts but stalls after a short time and will not restart, the fuel filter(s) may be clogged. For best results in cold weather, use Number 1–D Diesel fuel or "winterized" Number 2–D Diesel fuel which has an additive to minimize wax formation.

Your vehicle is also equipped with a bypass relief valve, located on the fuel control module, which provides fuel flow to the engine if the fuel pickup should become plugged by ice or wax. To allow this bypass valve to function and avoid engine fuel starvation, it is recommended that, during cold weather operation 0°C (32°F) or below, the fuel level in your tank should not be allowed to drop below 1/4 full. This will help prevent air from entering the fuel system and stalling the engine.

In cold weather below 0°C (32°F) your Diesel engine will slowly increase to a higher idle speed if left idling in P (Park). As the engine warms-up, the engine sound level will decrease due to the activation of PCM-controlled sound reduction features.

Operation in snow

Vehicle operation in heavy snowfall or in dry loose snow that may swirl around the front of the vehicle may feed excessive amounts of snow into the air intake system. This could plug the air cleaner with snow and cause the engine to stall.

Refer to *Air filter restriction gauge* in the *Diesel information* chapter and Engine air filter in the *Warning lights* chapter for more information.

Starting

Operation in standing water

Ingestion of water into the Diesel engine can result in immediate and severe damage to the engine. If driving through water, slow down to avoid splashing water into the intake. If the engine stalls, and ingestion of water into the engine is suspected, do not try to restart the engine. Consult your dealer for service immediately.

Engine block heater (if equipped)

Refer to the *Starting* chapter in your Owner Guide.

DUAL FUEL TANK SELECTOR CONTROL (IF EQUIPPED)

If your vehicle is equipped with dual fuel tanks, you will have a selector control, located to the right of the steering wheel, which allows you to draw fuel from either tank. Your fuel gauge will display the amount of fuel in the currently selected tank.

Fuel level indication is delayed for several minutes when the tank selector switch is actuated. Fuel level indication can be obtained immediately by turning off and restarting the engine.

MANUAL TRANSMISSION SHIFT SPEEDS

Do not overspeed the engine when going downhill or steep grades. If equipped, use the tachometer and do not allow engine speed to exceed the redline area. Operating the engine beyond the recommended speeds can cause severe engine damage.

Your vehicle has an electronic operating strategy which protects the engine system when the engine is operating with high coolant temperatures; fueling to the engine will be modified to prevent damage to the engine. Some power loss may be experienced if the vehicle is overloaded.

Upshift and downshift according to the following shift speed charts:

Upshifts when accelerating (recommended for best fuel economy)		
6-speed transmission		
Shift from:	Transfer case position[1] (if equipped)	
	2H or 4H	4L
LO-1	8 km/h (5 mph)	3 km/h (2 mph)
1-2	16 km/h (10 mph)	6 km/h (4 mph)
2-3	32 km/h (20 mph)	13 km/h (8 mph)
3-4	48 km/h (30 mph)	19 km/h (12 mph)
4 - Ⓓ (Overdrive)	64 km/h (40 mph)	24 km/h (15 mph)

Maximum downshift speeds[1]		
6-speed transmission		
Shift from:	Transfer case position (if equipped)[2]	
	2H or 4H	4L
Ⓓ (Overdrive) - 4	72 km/h (45 mph)	26 km/h (16 mph)
4-3	56 km/h (35 mph)	19 km/h (12 mph)
3-2	32 km/h (20 mph)	13 km/h (8 mph)
2-1	8 km/h (5 mph)	3 km/h (2 mph)
1-LO	Only shift to LO when at a stop.	
[1] Use 2H or 4H for 4WD equipped vehicles.		
[2] Downshift at lower speeds when driving on slippery surfaces.		

TRAILER TOWING

Refer to your Owner Guide for full details on towing a trailer.

Trailer towing tables

Excursion			
Engine	**Rear axle ratio**	**Maximum GCWR - kg (lbs.)**	**Maximum trailer weight - kg (lbs.)**
4x2			
6.0L	3.73	9072 (20000)	4988 (11000)
4x4			
6.0L	3.73	9072 (20000)	4990 (11000)

F-250			
Engine	**Rear axle ratio**	**Maximum GCWR - kg (lbs.)**	**Maximum trailer weight - kg (lbs.)**
Vehicles without fifth wheel			
6.0L	All	9072 (20000)	5670 (12500)
Regular Cab Pickup 4x2 with manual transmission and fifth wheel			
6.0L	All	9072 (20000)	6167 (13600)

F-250			
Engine	**Rear axle ratio**	**Maximum GCWR - kg (lbs.)**	**Maximum trailer weight - kg (lbs.)**
Regular Cab Pickup 4x2 with automatic transmission and fifth wheel			
6.0L	All	9072 (20000)	6213 (13700)
Regular Cab Pickup 4x4 with manual transmission and fifth wheel			
6.0L	All	9072 (20000)	6033 (13300)
Regular Cab Pickup 4x4 with automatic transmission and fifth wheel			
6.0L	All	9072 (20000)	6033 (13300)
SuperCab Pickup 4x2 with fifth wheel			
6.0L	All	9072 (20000)	6033 (13300)
SuperCab Pickup 4x4 with manual transmission and fifth wheel			
6.0L	All	9072 (20000)	5396 (11900)
SuperCab Pickup 4x4 with automatic transmission and fifth wheel			
6.0L	All	9072 (20000)	5578 (12300)
Crew Cab Pickup 4x2 with manual transmission and fifth wheel			
6.0L	All	9072 (20000)	5850 (12900)
Crew Cab Pickup 4x2 with automatic transmission and fifth wheel			
6.0L	All	9072 (20000)	5941 (13100)
Crew Cab Pickup 4x4 with manual transmission and fifth wheel			
6.0L	All	9072 (20000)	4671 (10300)
Crew Cab Pickup 4x4 with automatic transmission and fifth wheel			
6.0L	All	9072 (20000)	4807 (10600)

F-350 Regular Cab Single Rear Wheel Pickup			
Engine	**Rear axle ratio**	**Maximum GCWR - kg (lbs.)**	**Maximum trailer weight - kg (lbs.)**
Vehicles without fifth wheel			
6.0L	All	9072 (20000)	5670 (12500)
4x2 with manual transmission and fifth wheel			
6.0L	All	9072 (20000)	6167 (13600)
4x2 with automatic transmission and fifth wheel			
6.0L	All	9072 (20000)	6213 (13700)
4x4 with fifth wheel			
6.0L	All	9072 (20000)	6033 (13300)

F-350 Regular Cab Dual Rear Wheel Pickup			
Engine	**Rear axle ratio**	**Maximum GCWR - kg (lbs.)**	**Maximum trailer weight - kg (lbs.)**
Vehicles without fifth wheel			
6.0L	All	9072 (20000)	6031 (13300)
4x2 with manual transmission and fifth wheel			
6.0L	All	9072 (20000)	6031 (13300)
4x2 with automatic transmission and fifth wheel			
6.0L	All	9072 (20000)	6078 (13400)
4x4 with manual transmission and fifth wheel			
6.0L	All	9072 (20000)	5851 (12900)
4x4 with automatic transmission and fifth wheel			
6.0L	All	9072 (20000)	5897 (13000)

F-350 SuperCab Single Rear Wheel Pickup			
Engine	**Rear axle ratio**	**Maximum GCWR - kg (lbs.)**	**Maximum trailer weight - kg (lbs.)**
Vehicles without fifth wheel			
6.0L	All	9072 (20000)	5670 (12500)
4x2 with fifth wheel			
6.0L	All	9072 (20000)	6031 (13300)
4x4 with manual transmission and fifth wheel			
6.0L	All	9072 (20000)	5850 (12900)
4x4 with automatic transmission and fifth wheel			
6.0L	All	9072 (20000)	5897 (13000)

F-350 SuperCab Dual Rear Wheel Pickup			
Engine	**Rear axle ratio**	**Maximum GCWR - kg (lbs.)**	**Maximum trailer weight - kg (lbs.)**
Vehicles without fifth wheel			
6.0L	All	9072 (20000)	5895 (13000)
4x2 with fifth wheel			
6.0L	All	9072 (20000)	5895 (13000)
4x4 with fifth wheel			
6.0L	All	9072 (20000)	5714 (12600)

F-350 Crew Cab Single Rear Wheel Pickup			
Engine	**Rear axle ratio**	**Maximum GCWR - kg (lbs.)**	**Maximum trailer weight - kg (lbs.)**
Vehicles without fifth wheel			
6.0L	All	9072 (20000)	5670 (12500)
4x2 with manual transmission and fifth wheel			
6.0L	All	9072 (20000)	5850 (12900)
4x2 with automatic transmission and fifth wheel			
6.0L	All	9072 (20000)	5941 (13100)

F-350 Crew Cab Single Rear Wheel Pickup			
Engine	**Rear axle ratio**	**Maximum GCWR - kg (lbs.)**	**Maximum trailer weight - kg (lbs.)**
4x4 with fifth wheel			
6.0L	All	9072 (20000)	5759 (12700)

F-350 Crew Cab Dual Rear Wheel Pickup			
Engine	**Rear axle ratio**	**Maximum GCWR - kg (lbs.)**	**Maximum trailer weight - kg (lbs.)**
4x2			
6.0L	All	9072 (20000)	5804 (12800)
4x4			
6.0L	All	9072 (20000)	5625 (12400)

F-350 Regular Chassis Cab Single Rear Wheel (Fifth Wheel Towing)			
Engine	**Rear axle ratio**	**Maximum GCWR - kg (lbs.)**	**Maximum trailer weight - kg (lbs.)**
4x2			
6.0L	All	9072 (20000)	5942 (13100)
4x4			
6.0L	All	9072 (20000)	5761 (12700)

F-350 Regular Chassis Cab Dual Rear Wheel (Fifth Wheel Towing)			
Engine	**Rear axle ratio**	**Maximum GCWR - kg (lbs.)**	**Maximum trailer weight - kg (lbs.)**
4x2			
6.0L	All	9072 (20000)	5759 (12700)
4x4			
6.0L	All	9072 (20000)	5532 (12200)

F-350 SuperCab Chassis Cab Single Rear Wheel (Fifth Wheel Towing)			
Engine	**Rear axle ratio**	**Maximum GCWR - kg (lbs.)**	**Maximum trailer weight - kg (lbs.)**
4x2 with manual transmission			
6.0L	All	9072 (20000)	5759 (12700)
4x2 with automatic transmission			
6.0L	All	9072 (20000)	5804 (12800)
4x4			
6.0L	All	9072 (20000)	5579 (12300)

F-350 SuperCab Chassis Cab Dual Rear Wheel (Fifth Wheel Towing)			
Engine	**Rear axle ratio**	**Maximum GCWR - kg (lbs.)**	**Maximum trailer weight - kg (lbs.)**
4x2 with manual transmission			
6.0L	All	9072 (20000)	5623 (12400)
4x2 with automatic transmission			
6.0L	All	9072 (20000)	5668 (12500)
4x4 with manual transmission			
6.0L	All	9072 (20000)	5442 (12000)
4x4 with automatic transmission			
6.0L	All	9072 (20000)	5487 (12100)

F-350 Crew Cab Chassis Cab Single Rear Wheel (Fifth Wheel Towing)			
Engine	**Rear axle ratio**	**Maximum GCWR - kg (lbs.)**	**Maximum trailer weight - kg (lbs.)**
4x2 with manual transmission			
6.0L	All	9072 (20000)	5668 (12500)
4x2 with automatic transmission			
6.0L	All	9072 (20000)	5715 (12600)

F-350 Crew Cab Chassis Cab Single Rear Wheel (Fifth Wheel Towing)			
Engine	**Rear axle ratio**	**Maximum GCWR - kg (lbs.)**	**Maximum trailer weight - kg (lbs.)**
4x4 with manual transmission			
6.0L	All	9072 (20000)	5488 (12100)
4x4 with automatic transmission			
6.0L	All	9072 (20000)	5534 (12200)

F-350 Crew Cab Chassis Cab Dual Rear Wheel (Fifth Wheel Towing)			
Engine	**Rear axle ratio**	**Maximum GCWR - kg (lbs.)**	**Maximum trailer weight - kg (lbs.)**
4x2 with manual transmission			
6.0L	All	9072 (20000)	5534 (12200)
4x2 with automatic transmission			
6.0L	All	9072 (20000)	5579 (12300)
4x4 with manual transmission			
6.0L	All	9072 (20000)	5306 (11700)
4x4 with automatic transmission			
6.0L	All	9072 (20000)	5352 (11800)

F-450			
Engine	**Rear axle ratio**	**Maximum GCWR - kg (lbs.)**	**Maximum trailer weight - kg (lbs.)**
Regular Chassis Cab 4x2 with manual transmission			
6.0L	All	11793 (26000)	8163 (18000)
Regular Chassis Cab 4x2 with automatic transmission			
6.0L	All	11793 (26000)	8210 (18100)
Regular Chassis Cab 4x4 with manual transmission			
6.0L	All	11793 (26000)	8027 (17700)

F-450			
Engine	**Rear axle ratio**	**Maximum GCWR - kg (lbs.)**	**Maximum trailer weight - kg (lbs.)**
Regular Chassis Cab 4x4 with automatic transmission			
6.0L	All	11793 (26000)	8074 (17800)
SuperCab Chassis Cab 4x2			
6.0L	All	11793 (26000)	8029 (17700)
SuperCab Chassis Cab 4x4			
6.0L	All	11793 (26000)	7847 (17300)
Crew Cab Chassis Cab 4x2			
6.0L	All	11793 (26000)	7938 (17500)
Crew Cab Chassis Cab 4x4			
6.0L	All	11793 (26000)	7802 (17200)

F-550			
Engine	**Rear axle ratio**	**Maximum GCWR - kg (lbs.)**	**Maximum trailer weight - kg (lbs.)**
Regular Chassis Cab 4x2			
6.0L	All	11793 (26000)	8165 (18000)
Regular Chassis Cab 4x4 with manual transmission			
6.0L	All	11793 (26000)	7981 (17600)
Regular Chassis Cab 4x4 with automatic transmission			
6.0L	All	11793 (26000)	8029 (17700)
SuperCab Chassis Cab 4x2			
6.0L	All	11793 (26000)	8029 (17700)
SuperCab Chassis Cab 4x4			
6.0L	All	11793 (26000)	7802 (17200)
Crew Cab Chassis Cab 4x2 with manual transmission			
6.0L	All	11793 (26000)	7893 (17400)
Crew Cab Chassis Cab 4x2 with automatic transmission			
6.0L	4.88	11793 (26000)	7891 (17400)

F-550			
Engine	**Rear axle ratio**	**Maximum GCWR - kg (lbs.)**	**Maximum trailer weight - kg (lbs.)**
6.0L (with high capacity trailer tow package)	4.88	13608 (30000)	9705 (21400)
Crew Cab Chassis Cab 4x4 with manual transmission			
6.0L	All	11793 (26000)	7709 (17000)
Crew Cab Chassis Cab 4x4 with automatic transmission			
6.0L	All	11793 (26000)	7756 (17100)

SCHEDULED MAINTENANCE

The scheduled maintenance services in the *Scheduled maintenance guide* section are required because they are considered essential to the life and performance of your vehicle.

Use only recommended fuel, lubricants, fluids and service parts conforming to Ford specifications. Motorcraft parts are designed and built for best performance in your vehicle.

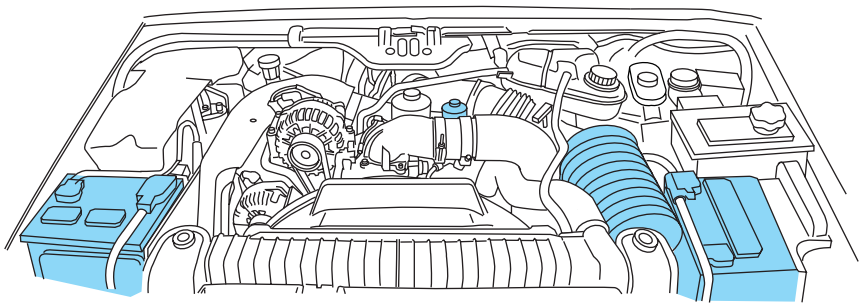
CLEANING THE ENGINE

Engines are more efficient when they are clean because grease and dirt buildup keep the engine warmer than normal. When washing:

- The engine must be cool to the touch before spraying with water.
- **Never spray a hot engine with cold water, as damage to the engine block or engine components may occur.**
- Use caution when using a self-serve power washer (1,000 psi maximum pressure) to clean the engine, as the high-pressure fluid could penetrate the sealed parts and cause damage.
- **Never apply anything to any exposed belts in the engine compartment, including the belt dressing.**

For general cleaning of the engine and engine compartment, spray Engine Shampoo (ZC-20) on all parts that require cleaning and pressure rinse the area with cool water.

Cover the highlighted areas to prevent water damage when cleaning the engine **(never wash or rinse the engine while it is running; water in the running engine may cause internal damage)**:



FUEL REQUIREMENTS

The engine is designed to use low sulfur number 1–D or 2–D Diesel fuel only. At temperatures below -7°C (20°F), number 1–D or winter blend number 2–D fuel is recommended. (See *Cold weather operation* in the *Starting* chapter.)

Do not use fuel intended for agricultural use (agricultural fuel is dyed red), home heating oil or any Diesel fuel not intended for highway use. Damage to the fuel injection system, engine and exhaust catalyst can occur if an improper fuel is used.

Do not add gasoline, gasohol or alcohol to Diesel fuel. This practice creates a serious fire hazard and engine performance problems.

It should not be necessary to add any aftermarket additives to your fuel tank if you use a properly formulated Diesel fuel that meets the ASTM D 975 industry specification. Aftermarket additives can damage the injector system or engine.

Do not blend used engine oil with Diesel fuel under any circumstances. Blending used oil with the fuel will significantly increase your vehicle's exhaust emissions and reduce engine life due to increased internal wear.

Do not crank the engine for more than 30 seconds at a time as damage to the starter motor may result.

If the engine fails to start in 30 seconds, turn the key to the OFF position and wait 30 seconds before trying again.

If air is allowed to enter the fuel system (during fuel filter change or if you run out of fuel) the engine will purge the trapped air as it runs. The engine may run rough and produce white smoke while air is in the system. This is normal and should correct itself in a short time.

An engine that suddenly becomes noisy or operates poorly after a fuel fill could be using substandard fuel (i.e., high water content, low cetane rating or gasoline in the fuel). Diesel fuel should be purchased from a reputable station which sells a large amount of Diesel fuel.

Care should be taken whenever Diesel fuel is stored. Use only clean, approved containers which will prevent the entry of dirt or water.

Diesel fuel must not be stored in a galvanized container. The fuel will dissolve the zinc in a galvanized container. The zinc will then remain in solution until it is run through the engine where it will be deposited in the fuel injectors causing expensive-to-repair damage.

Diesel fuel dispensing nozzle fill rate

Truck stops have pumps and nozzles designed for larger, heavy-duty trucks. When refueling at truck stops: if the nozzle shuts off repeatedly when refueling, wait 5–10 seconds; then use a slower rate of flow (don't depress the nozzle trigger as far).

This truck is equipped with a fuel fill pipe which is able to accept fuel up to 20 gallons per minute from an 1 1/8 inch fuel dispensing nozzle. Pumping fuel at greater flow rates may result in premature nozzle shut-off or spitback.

HORIZONTAL FUEL CONDITIONING MODULE (HFCM) (FUEL FILTER/WATER SEPARATOR)

The vehicle is equipped with a Horizontal Fuel Conditioning Module (HFCM) located on the frame-rail under the driver-side floorboard near the transmission.

Water should be drained from the module assembly whenever the warning light comes on. The WATER IN FUEL light will come on when approximately 100 cc (0.2 pints) of water accumulates in the module.

Replace the fuel filters with Ford Part No. 3C3Z-9N184–CA. This part number includes filters and seals for both the engine-mounted and frame-mounted filters.

DRIAINING THE HFCM AND CHANGING THE FUEL FILTERS

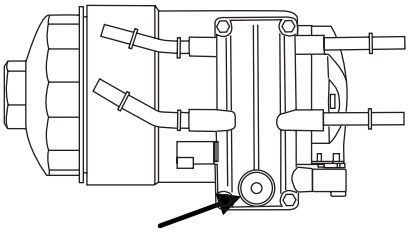
Your vehicle is equipped with two fuel filters; one mounted on top of the engine and the other, the HFCM, mounted inside the frame rail under the driver-side floorboard near the transmission. Both filters should be replaced at the same time.

HFCM drain procedure

1. Stop the vehicle and **shut off** the engine.

The vehicle must be stopped with the engine off when draining the HFCM. Fuel may ignite if separator is drained while the engine is running or vehicle is moving.

2. Locate the HFCM and place an appropriate container under the drain plug (see illustration).



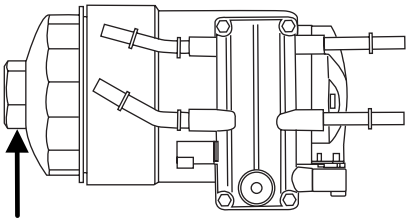
3. Remove the drain plug, using a 6mm hex drive, by turning it counterclockwise. Allow the HFCM to drain for approximately 25 seconds or until clean fuel is observed. Install the drain plug by turning it clockwise until it is firmly seated.

4. Verify that the drain plug is closed and sealed, then remove the container from under the vehicle.

5. Restart the engine and check WATER IN FUEL indicator light; it should not be illuminated. If it continues to illuminate, have the fuel system checked and repaired.

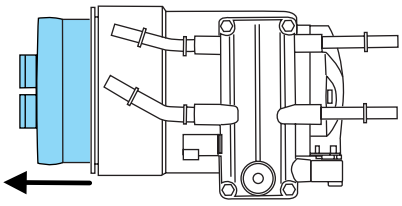
Removal - HFCM filter

1. Remove the fuel filter cap by turning counterclockwise.

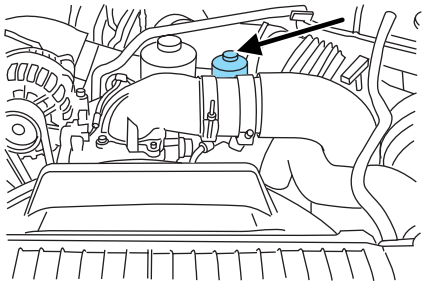


2. Remove and discard the old fuel filter element.

3. Carefully clean the mating surfaces.



Removal - Engine-mounted fuel filter



1. Remove the fuel filter cap by turning counterclockwise.
2. Remove and discard the old fuel filter element.
3. Carefully clean the mating surfaces.

Installation-both

The engine will not run properly if the fuel filter is not installed in housing.

1. Install the new fuel filter and cap seal (from Ford Part No. 3C3Z-9N184–CA) into the fuel filter housing.
2. Tighten cap onto fuel filter housing slowly, allowing fuel to soak into the fuel filter element. Tighten cap until it contacts the housing.

After replacing the fuel filter, the engine will purge the trapped air as it runs. The engine may run roughly and smoke until the air is completely eliminated.

Using a fuel which has more than average impurities may require the fuel filter to be replaced more frequently than the service interval specifies.

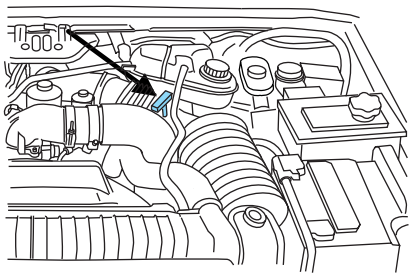
ENGINE OIL

Checking the engine oil level

Because it is normal to add some oil between oil changes, check your engine oil level each time you stop for fuel. To check the engine oil level consistently and accurately, the following procedure is recommended:

1. Have engine at normal operating temperature (at least into the NORMAL range on the engine coolant temperature gauge).
2. Park the vehicle on a level surface, then turn off the engine and open the hood.
3. Allow at least **20 minutes** after engine shutdown to assure that the oil contained in the upper parts of the engine has returned to the oil pan.

4. Protecting yourself from engine heat, pull out the dipstick, wipe it clean and reinsert fully.



5. Read oil level on both sides of dipstick and use highest level (reading) for the actual engine oil level.

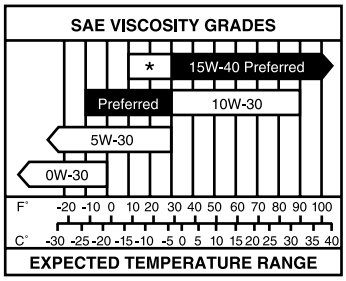
6. Maintain the oil level between ADD and OPERATING RANGE on the dipstick by adding oil as required. The distance from ADD to OPERATING RANGE on the dipstick represents 1.9L (2 quarts). Do not overfill. If the oil level exceeds OPERATING RANGE, oil consumption may result.

Engine oil specifications

To help achieve proper engine performance and durability, it is important that only engine lubricating oils of the proper quality are used in your Diesel engine and that the engine oil is changed **no later** than the recommended interval. Diesel engines require specially formulated oil to resist contamination. Proper quality oils also provide maximum efficiency of the crankcase ventilating system which reduces air pollution.

For normal or severe service, use Motorcraft oil or an equivalent oil conforming to Ford Specification WSS-M2C171–D or API Service categories CI-4, CI-4/SL or DHD-1. If CI-4 oil is not available, CH-4 is acceptable..

Engine oils with improved fuel economy properties (energy conserving) are currently available. If you use an energy conserving oil, be sure it meets the recommended Ford Specification, *API* service categories and SAE viscosity grades listed in the Lubricant and Maintenance Materials Specifications chart. Some energy conserving oils *do not* meet the requirements necessary for your Diesel engine.



* Heavy duty trailer towing with ambient temperatures above 10°C (50°F) requires 15W-40 engine oil.

The use of correct oil viscosities for Diesel engines is important for satisfactory operation. Determine which oil viscosity best suits the temperature range you expect to encounter for the next service interval.

A symbol has been developed by the American Petroleum Institute (API) to help you select the proper engine oil. It will be included on the oil container you purchase. The top section of the symbol shows the oil performance by the API designation. This should match the owner guide recommendation. The center section will show the SAE viscosity grade. The lower section will state energy conserving if the oil has proven fuel saving capabilities.

Changing engine oil and filter

Change your oil and filter according to the scheduled maintenance guide. Change more frequently if your vehicle operation includes extended periods of idling or low-speed operation, driving for a long time in cold temperatures or driving short distances. See the following section *Engine lubrication for severe service operation* for all severe duty restrictions.

Use Ford Engine Oil Filter Part No. 3C3Z-6731–AA (FL–2016) or equivalent. These filters protect your engine by filtering harmful, abrasive or sludge particles. The FL–2016 filters particles significantly smaller than most available “will-fit” filters.

To replace the filter,

1. Unscrew the oil filter cap and wait a few seconds for the oil to drain through the built-in drain valve. **Note:** The filter should be changed before reinstalling the oil pan drain plug.

2. Reinstall and tighten the oil filter cap.


Do not handle a hot oil filter with bare hands.


Continuous contact with USED motor oil has caused cancer in laboratory mice. Protect your skin by washing with soap and water.

Engine lubrication for severe service operation

The following severe service operating conditions require unique engine maintenance procedures:

- towing a trailer over 1,600 km (1,000 miles)
- sustained, high speed driving at Gross Vehicle Weight Rating (maximum loaded weight for vehicle operation during hot weather-above 32°C [90°F]).
- frequent or extended idling (over 10 minutes per hour of normal driving).
- operating in severe dust conditions.
- frequent, short trips of 16 km (10 miles) or less during freezing weather

If you are operating your vehicle under any of these conditions, observe the following service procedures:

- Change engine oil and filter every 8,000 km (5,000 miles).
- Use Motorcraft oil or an equivalent oil conforming to Ford Specification WSS-M2C171–D or API categories CI-4, CI–4/SL or DHD-1. If CI-4 oil is not available, CH-4 is acceptable.

For more information refer the *Severe duty maintenance schedule* in the scheduled maintenance guide.

REPLACING THE AIR FILTER ELEMENT

When replacing the air filter element, use the Motorcraft air filter element listed. Refer to *Lubricant and maintenance materials specifications* in this supplement.

Failure to use the correct air filter element may result in severe engine damage.

1. Remove air filter element from the housing, taking care to prevent dirt from falling into the engine air intake.

2. Clean the air filter housing and cover to ensure good sealing.

3. Install a new air filter element. Be careful not to crimp the filter edges between the air filter housing and cover. This could cause damage to the air filter element and possible severe damage to the engine.

When servicing the air filter, always be sure that the auxiliary hose is not kinked or obstructed. Failure to do so may result in severe engine damage when driving through deep water and/or encountering unusually heavy precipitation conditions.

ENGINE COOLANT

Checking engine coolant

The concentration and level of engine coolant should be checked at the mileage intervals listed in the scheduled maintenance guide. The coolant concentration should be maintained at 50/50 coolant and water, which equates to a freeze point of -36° C (-34° F). Coolant concentration testing is possible with a hydrometer or antifreeze tester (such as the Rotunda Battery and Antifreeze Tester, 014–R1060). The level of coolant should be maintained at the “cold full” of “cold fill range” level in the coolant reservoir. If the level falls below, add coolant per the instructions in the *Adding engine coolant* section.

Your vehicle was factory-filled with a 50/50 engine coolant and water concentration. If the concentration of coolant falls below 40% or above 60%, the engine parts could become damaged or not work properly. **A 50/50 mixture of coolant and water provides the following:**

- **freeze protection down to -36° C (-34° F).**
- **boiling protection up to 129° C (265° F).**
- **protection against rust and other forms of corrosion.**
- **enables calibrated gauges to work properly.**

When the engine is cold, check the level of the engine coolant in the reservoir.

- The engine coolant should be at the “cold fill level” or within the “cold fill range” as listed on the engine coolant reservoir (depending upon application).
- Refer to the scheduled maintenance guide for service interval schedules.
- Be sure to read and understand *Precautions when servicing your vehicle* in your owner guide.

If the engine coolant has not been checked at the recommended interval, the engine coolant reservoir may become low or empty. If the reservoir is low or empty, add engine coolant to the reservoir. Refer to *Adding engine coolant* in this chapter.

Note: Automotive fluids are not interchangeable; do not use engine coolant or windshield washer fluid outside of its specified function and vehicle location.

Vehicles with Diesel engines typically are used to carry heavy loads and accumulate mileage rapidly. These two factors cause the additives in the coolant to “wear out” in a shorter time. Replace the engine coolant initially after five years or 100,000 miles and three years or 50,000 miles thereafter. Vehicles equipped with the yellow coolant do not require any additives.

Adding engine coolant

When adding coolant, make sure it is a 50/50 mixture of engine coolant and distilled water. Add the mixture to the coolant reservoir, **when the engine is cool**, until the appropriate fill level is obtained.

Do not add engine coolant when the engine is hot. Steam and scalding liquids released from a hot cooling system can burn you badly. Also, you can be burned if you spill coolant on hot engine parts.

Do not put engine coolant in the windshield washer fluid container. If sprayed on the windshield, engine coolant could make it difficult to see through the windshield.

General maintenance information

The cooling system in your vehicle is filled with yellow-colored Motorcraft Premium Gold Engine Coolant meeting Ford Specification WSS-M97B51–A1.

- **Add Motorcraft Premium Gold Engine Coolant (yellow-colored), VC-7–A (VC-7–B in Oregan).**

Note: Use of Motorcraft Cooling System Stop Leak Pellets, VC-6, darkens the color of Motorcraft Premium Gold Engine Coolant from yellow to golden tan.

- **Do not add/mix an orange-colored, extended life coolant such as Motorcraft Speciality Orange Engine Coolant, VC-2 (US) or CXC-209 (Canada), meeting Ford specification WSS-M97B44–D with the factory-filled coolant.** Mixing Motorcraft Speciality Orange Engine Coolant or any orange-colored extended life product with your factory filled coolant can result in degraded corrosion protection.
- A large amount of water without engine coolant may be added, in case of emergency, to reach a vehicle service location. In this instance, the cooling system must be drained and refilled with a 50/50 mixture of engine coolant and distilled water as soon as possible. Water alone (without engine coolant) can cause engine damage from corrosion, overheating or freezing.
- **Do not use alcohol, methanol or brine or any engine coolants mixed with alcohol or methanol antifreeze (coolant).** Alcohol and other liquids can cause engine damage from overheating or freezing.
- **Do not add extra inhibitors or additives to the coolant.** These can be harmful and compromise the corrosion protection of the engine coolant.
- **Do not mix with recycled coolant unless from a Ford-approved recycling process (see** *Use of recycled engine coolant* **section).**

For vehicles with overflow coolant systems with a non-pressurized cap on the coolant recovery system, add coolant to the coolant recovery reservoir when the engine is cool. Add the proper mixture of coolant and water to the “cold full” level. For all other vehicles, which have a coolant degas system with a pressurized cap, or if it is necessary to remove the coolant pressure relief cap on the radiator of a vehicle with an overflow system, follow these steps to add engine coolant.

General maintenance information

To reduce the risk of personal injury, make sure the engine is cool before unscrewing the coolant pressure relief cap. The cooling system is under pressure; steam and hot liquid can come out forcefully when the cap is loosened slightly.

1. Before you begin, turn the engine off and let it cool.

2. When the engine is cool, wrap a thick cloth around the coolant pressure relief cap on the coolant reservoir (an semi-clear plastic bottle). Slowly turn cap counterclockwise (left) until pressure begins to release.

3. Step back while the pressure releases.

4. When you are sure that all the pressure has been released, use the cloth to turn it counterclockwise and remove the cap.

5. Fill the coolant reservoir slowly with the proper coolant mixture (see above), to within the “cold fill range” or the “cold full” level on the reservoir. If you removed the radiator cap in an overflow system, fill the radiator until the coolant is visible and radiator is almost full.

6. Replace the cap. Turn until tightly installed. (Cap must be tightly installed to prevent coolant loss.)

After any coolant has been added, check the coolant concentration see *Checking engine coolant* section). If the concentration is not 50/50 (protection to –34°F/–36°C), drain some coolant and adjust the concentration. It may take several drains and additions to obtain a 50/50 coolant concentration.

Whenever coolant has been added, the coolant level in the coolant reservoir should be checked the next few times you drive the vehicle. If necessary, add enough 50/50 concentration of engine coolant and distilled water to bring the liquid level to the proper level.

If you have to add more than 1.0 liter (1.0 quart) of engine coolant per month, have your dealer check the engine cooling system. Your cooling system may have a leak. Operating an engine with a low level of coolant can result in engine overheating and possible engine damage.

Replacing coolant

A coolant mixture of 50% coolant concentrate and 50% water is recommended to maintain best overall performance. To avoid damaging the engine and radiator, the coolant concentrate should not exceed 60%. When refilling the coolant system either as part of the regular maintenance (refer to the scheduled maintenance guide), or due to service performed, adhere to the following instructions:

1. Drain and flush the cooling system to remove dirt deposits, oil, rust particles.

2. Fill the coolant reservoir with the specified coolant/water mixture until the level stabilizes at the top hose fitting. Replace and tighten cap. Fill the coolant bottle to the cold fill mark.

3. Reinstall the coolant bottle cap.

4. Start and idle engine until the radiator upper hose is warm (approximately 10–15 minutes). If the hose does not get warm then repeat at a higher engine speed.

5. Immediately shut off engine. Allow engine to cool before removing coolant bottle cap. Cautiously remove coolant bottle cap and add coolant to Cold Fill mark.

Recycled engine coolant

Ford Motor Company does NOT recommend the use of recycled engine coolant in vehicles originally equipped with Motorcraft Premium Gold Engine Coolant since a Ford-approved recycling process is not yet available.

Used engine coolant should be disposed of in an appropriate manner. Follow your community's regulations and standards for recycling and disposing of automotive fluids.

Coolant refill capacity

To find out how much fluid your vehicle's cooling system can hold, refer to *Refill capacities* in this chapter.

Fill your engine coolant reservoir as outlined in *Adding engine coolant*.

Severe climates

If you drive in extremely cold climates (less than –36° C [–34° F]):

- **it may be necessary to increase the coolant concentration above 50%.**
- **NEVER increase the coolant concentration above 60%.**

- **increased engine coolant concentrations above 60% will decrease the overheat protection characteristics of the engine coolant and may cause engine damage.**
- **refer to the chart on the coolant container to ensure the coolant concentration in your vehicle will provide adequate freeze protection at the temperatures in which you drive in the winter months.**

If you drive in extremely hot climates:

- **it is still necessary to maintain the coolant concentration above 40%.**
- **NEVER decrease the coolant concentration below 40%.**
- **decreased engine coolant concentrations below 40% will decrease the corrosion protection characteristics of the engine coolant and may cause engine damage.**
- **decreased engine coolant concentrations below 40% will decrease the freeze protection characteristics of the engine coolant and may cause engine damage.**
- **refer to the chart on the coolant container to ensure the coolant concentration in your vehicle will provide adequate protection at the temperatures in which you drive.**

Vehicles driven year-round in non-extreme climates should use a 50/50 mixture of engine coolant and distilled water for optimum cooling system and engine protection.

EMISSION CONTROL SYSTEM(S) LAWS

Federal law prohibits vehicle manufacturers, dealers and other persons engaged in the business of repairing, servicing, selling, leasing or trading motor vehicles as well as fleet operations from unknowingly removing or rendering emission control system(s) inoperative. Further, modifications of the emission control system(s) could create liability on the part of the individual owners under the laws of some states. In Canada, modifications of the emission control system(s) could create liability under applicable Federal or Provincial laws.

Do not remove or alter the original equipment floor covering or insulation between it and the metal floor of the vehicle. The floor covering and insulation protect occupants of the vehicle from the engine and exhaust system heat and noise. On vehicles with no original equipment floor covering insulation, do not carry passengers in a manner that permits prolonged skin contact with the metal floor. Provide adequate insulation.

NOISE EMISSIONS WARRANTY, PROHIBITED TAMPERING ACTS AND MAINTENANCE

On January 1, 1978, Federal regulation became effective governing the noise emission on trucks over 4,536 kg (10,000 lbs.) GVWR (Gross Vehicle Weight Rating). The following statements concerning prohibited tampering acts and maintenance, and the noise warranty found in the Warranty Facts Booklet, are applicable to complete chassis cabs over 4,536 (10,000 lbs.) GVWR.

Tampering with noise control system prohibited

Federal law prohibits the following acts or the causing thereof: (1) The removal or rendering inoperative by any person other than for purposes of maintenance, repair or replacement of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use, or (2) the use of the vehicle after such device or element of design has been removed or rendered inoperative by any person.

Among those acts which the U.S. Environmental Protection Agency may presume to constitute tampering are the acts listed below:

- Removal of hood blanket, fender apron absorbers, fender apron barriers, underbody noise shields or acoustically absorptive material.
- Tampering or rendering inoperative the engine speed governor, so as to allow engine speed to exceed manufacturer's specifications.

Scheduled maintenance

ENGINE EMISSIONS LABEL

Emissions information appears on the Engine Emissions label on the engine valve cover. This decal identifies engine displacement and provides certain engine specifications.

Any modification of the emissions control system could create liability under federal law (U.S.) if made prior to sale and registration, under the laws of some states if made thereafter. Further, federal law prohibits vehicle manufacturers, dealers and other persons engaged in the business of repairing, servicing, selling, leasing or trading motor vehicles as well as fleet operations from knowingly removing or rendering an emissions control system inoperative after sale and delivery to an ultimate purchaser. In Canada, modifications of the emissions control system could create liability under applicable federal or provincial laws.

SCHEDULED MAINTENANCE SERVICES

Refer to your scheduled maintenance guide for details of maintenance on your vehicle.

If you are using your vehicle in a manner in which it will remain stationary (door to door service, taxi, etc.), then it is recommended that you change the engine oil every 200 engine hours as opposed to a mileage limit. Since most vehicles are not equipped with hourmeters, it may be necessary for you to approximate your time and plan engine oil and filter changes accordingly.

The complexity of the Diesel engine makes it so the owner is discouraged from attempting to perform maintenance other than the services described in this supplement.

If you experience difficult starting, rough idling, excessive exhaust smoke, a decrease in engine performance or excess fuel consumption, perform the following checks:

- a plugged air inlet system or engine air filter element.
- water in the fuel filter/water separator.
- a clogged fuel filter.
- contaminated fuel.
- air in the fuel system, due to loose connections.
- an open or pinched sensor hose.
- low engine oil level.
- wrong fuel or oil viscosity for climactic conditions.

If these checks do not help you correct the engine performance problem you are experiencing, consult an authorized dealer.

FUELING

Do not use starting fluid such as ether or gasoline in the Diesel air intake system. Such fluids can cause immediate explosive damage to the engine and possible personal injury.

If you fuel your vehicle at a truck stop, you may notice that the fuel nozzle may shut off every 5–10 seconds. This is due to the flow rates being designed for larger heavy duty trucks. You may have to fuel at a slower rate (don't depress the nozzle trigger fully).

Do not run your Diesel vehicle out of fuel as this will allow air to enter the fuel system which will make restarting difficult. Longer engine cranking time may be required once air is in the fuel system. If air enters the fuel system (either through running the fuel tank(s) empty or during a fuel filter change), the engine will self-purge the trapped air once it starts running. The engine may run roughly and produce white smoke while air is in the fuel system; this is normal and should stop after a short time.

Minor troubleshooting guide

IF THE ENGINE WON'T CRANK

Turn on the headlights. If the lights are dim, do not go on at all or if when the ignition is turned to START the lights become dim or go out, the battery connections may be loose or corroded, or the battery may be discharged. If there is a clicking or stuttering sound coming from the engine compartment when you turn the key to START, this may also indicate a loose or corroded battery connection.

Check the battery connections at the battery posts, cable connection to the engine grounding point and at the starter connection.

If a discharged battery is suspected, have it checked and corrected.

- For vehicles with manual transmissions, the clutch pedal **must** be fully depressed in order for the starter to operate.
- For vehicles with automatic transmissions, the gearshift lever must be in Park or Neutral in order for the starter to operate.
- Try operating the starter switch several times. Should the switch be corroded, this operation may clean the contacts or make the switch temporarily operable until you can reach the dealer.
- If all electrical connections are tight and you need assistance to start, see *Jump Starting* in the *Roadside emergencies* chapter of your owner guide.

IF ENGINE CRANKS BUT WON'T START

Prolonged starter cranking (in excess of 30 seconds) could cause damage to the starter motor.

- Check the fuel gauge. You may be out of fuel. If the gauge shows that there is fuel in the tank, the trouble may be in the electrical system or the fuel system. If equipped with an auxiliary tank, be sure that the tank control switch is set for the tank with fuel and not on an empty tank.
- Leaving the ignition key ON for over two minutes without starting may make starting difficult because the glow plugs will cease activation. Reset the system by turning the ignition key to OFF and then back to ON again.

IF THE ENGINE RUNS HOT

The following could cause the engine to overheat:

- Lack of coolant.
- Dirty cooling system.
- Plugged radiator fins, charge air cooler, A/C condenser and/or oil cooler.
- Driving with frozen coolant.
- Sticking thermostat.
- Overloading or pulling heavy trailers during hot weather.
- Grill or radiator air blockage.
- Slipping or missing drive belt.
- Plugged or very dirty air cleaner element.

IF FUSES BURN OUT

Burned-out or blown fuses usually indicate an electrical short-circuit, although a fuse may occasionally burn out from vibration. Insert a second fuse. If this fuse immediately burns out and you cannot locate the cause, return your vehicle to your dealer for a circuit check.

Replacement fuses and circuit breakers must always be the same rating as the original equipment shown. Never replace a fuse or circuit breaker with one of a higher rating. Higher rated fuses or circuit breakers could allow circuit overloading in the event of a circuit malfunction, resulting in severe vehicle damage or personal injury.

Refer to the “Owner Guide” for replacement of fuses.

Capacities and specifications

REFILL CAPACITIES

Component	Capacity
Cooling system[1]	26.0L (27.5 quarts)
Engine oil [2]	14.2L (15.0 quarts)
Fuel tank (F-250/350/450/550)	Refer to Owner Guide
Fuel tank (Excursion)	166.6L (44.0 gallons)
Radiator cap	110 kPa (16 psi)
Manual transmission [3]	5.5L (5.8 quarts)
Automatic transmission	Refer to Owner Guide

[1]Includes heater and 4.7L (5 quarts) in coolant recovery.

[2]Includes 1.0L (1 quart) in engine oil filter.

[3]Use Motorcraft MERCON® ATF, Motorcraft part number XT-2–QDX, meeting Ford specification MERCON®.

BULB SPECIFICATIONS

Lamp description	Number of bulbs required	Trade number
Wait to Start Light	1	194
Water-in-Fuel Light	1	194
Engine Temp. Light	1	194

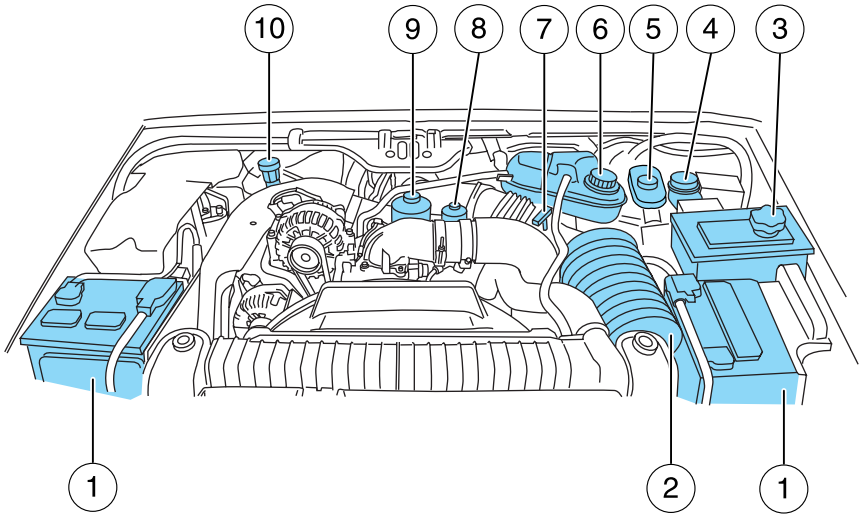
LUBRICANT AND MAINTENANCE MATERIALS SPECIFICATIONS

Item	Ford Part Name	Ford Part Number	Ford Specification
Engine Oil	Motorcraft Motor Oil 15W40 Super Duty, 10W30 Super Duty[1]	XO-15W40-QSD, XO-10W30-QSD	WSS-M2C171-D, CI-4/SL, DHD-1
Engine Oil Filter (Use this filter Only)	-	3C3Z-6731–AA (FL–2016)	-
Air Filter[2]	-	FA-1680	ES-E95AE-9601-AA
Battery (2 Required)	-	BXT-65-750	-
Engine coolant	Motorcraft Premium Gold Engine Coolant (yellow-colored)	VC-7–A	WSS-M97B51–A1
Manual Transmission	Motorcraft MERCON® ATF	XT-2–QDX	MERCON®

[1]Refer to the engine oil specification chart located under *Engine oil specifications* in the *General maintenance information* chapter.

[2]Always use the authorized Motorcraft air filter listed. **Failure to use the correct air filter may result in severe engine damage.**

Service points



1. Battery (dual batteries shown)
2. Air filter assembly
3. Power steering fluid reservoir
4. Clutch fluid reservoir (if equipped)
5. Brake fluid reservoir
6. Engine coolant reservoir
7. Engine oil dipstick
8. Engine-mounted fuel filter assembly
9. Engine oil filter
10. Engine oil filler

GENERAL OWNER'S INFORMATION

Vehicle Identification Number (VIN):

Owner Name: _____

Address: _____

_____

Your satisfaction is our #1 goal. If you have questions or concerns about your vehicle, we suggest you follow these steps:

1. Contact your Sales Representative or Service Advisor at your selling/servicing dealership.
2. If the inquiry or concern remains unresolved, contact the Sales Manager or Service Manager at the dealership.
3. If the inquiry or concern cannot be resolved at the dealership level, please contact the Ford Customer Assistance Center.

In the US, contact:
Ford Motor Company Customer Assistance Center
16800 Executive Plaza Drive, P.O. Box 6248
Dearborn, Michigan 48126
1-800-392-3673 (FORD)
TDD for the hearing impaired: 1-800-232-5952

In Canada, contact:
Customer Assistance Center
Ford Motor Company of Canada, Limited
P.O. Box 2000
Oakville, Ontario L6J 5E4
1-800-565-3673 (FORD)

General Owner's Information

In Puerto Rico and Virgin Islands, contact:
Ford Motor Company Caribbean Inc.
P.O. Box 11957, Caparra Heights Station
San Juan, PR 00922-1957
Telephone: (787) 782-5959
Fax: (787) 781-8975
E-mail: prcac@ford.com

In Caribbean, Central America, Israel and Sub-Saharan Africa, contact:
Ford Motor Company
Worldwide Direct Market Operations
Attention: Owner Relations
1555 Fairlane Drive, Fairlane Business Park #3
Allen Park, MI 48101 U.S.A.
Telephone: (313) 594-4857
Fax: (313) 390-0804
E-mail: wdmocac@ford.com

In the Middle East and North Africa, contact:
Ford Middle East and North Africa
Customer Assistance Center
API World Tower 17th Floor
Sheikh Zayed Road
Dubai, United Arab Emirates
Telephone: 971-4-326084
Fax: 971-4-327299
E-mail: menacac@ford.com

FIND YOUR WAY

Symbol Key

Diesel	Diesel
T	Towing a trailer or using a camper or car-top carrier
I	Extensive idling and/or low-speed driving for long distances as in heavy commercial use such as delivery, taxi, patrol car or livery
D	Operating in dusty conditions such as unpaved or dusty roads
O	Off-road operation
C	Short trip cold operating conditions

GENERAL MAINTENANCE INFORMATION

Why maintain your vehicle?

This guide describes the scheduled maintenance required for your vehicle. Carefully following this schedule helps protect against major repair expenses resulting from neglect or inadequate maintenance and may also help to increase the value of your vehicle when you sell or trade it.

It is your responsibility to see that all scheduled maintenance is performed and that the materials used meet Ford engineering specifications. Failure to perform scheduled maintenance specific in this guide will invalidate warranty coverage on parts affected by the lack of maintenance. Be sure receipts for completed maintenance are kept with the vehicle and confirmation of the work performed is always recorded in this guide.

Your Ford or Lincoln Mercury dealer, or Ford or Lincoln Mercury Quality Care Center has factory trained technicians who can perform the required maintenance using genuine Ford parts. They are committed to meeting your service needs and to assuring your continuing satisfaction.

Protecting your investment

Maintenance is an investment that will pay dividends in the form of improved reliability, durability and resale value. To assure the proper performance of your vehicle and its emission control systems, it is imperative that scheduled maintenance be completed at the designated intervals.

Ford strongly recommends the use of genuine Ford replacement parts. Parts other than Ford, Motorcraft or Ford authorized remanufactured parts that are used for maintenance replacement or for the service of components affecting emission control must be equivalent to genuine Ford Motor Company parts in performance and durability. It is the owner's responsibility to determine the equivalency of such parts. Please consult your Warranty Guide for complete warranty information.

Quality Care - one stop for all your maintenance needs

When you need maintenance for your Ford, Lincoln or Mercury vehicle, there's only one name to remember: Quality Care, available at your Ford and Lincoln Mercury dealership. From scheduled maintenance to more complicated repair work, nobody knows your car or truck better. Protect your investment by choosing Quality Care service.

The right people

The difference is factory training and equipment, which means nobody is more qualified to work on your Ford, Lincoln or Mercury than our Quality Care service technicians. They'll fix it right the first time.

The right parts

From headlights to taillights and everything in between, nothing fits like an original. With Quality Care service, you'll get the parts made especially for your car or truck – genuine Ford and Motorcraft® parts.

The right prices

Our commitment to quality extends to pricing as well as service. Your Ford and Lincoln Mercury Dealership offers competitive prices on Genuine Ford and Motorcraft® parts and services, making Quality Care a great value.

WHICH MAINTENANCE SCHEDULE SHOULD YOU FOLLOW?

Owner Checks and Services

Refer to Mileage Intervals for Additional Checks and Services

Certain basic maintenance checks and inspections should be performed by the owner or a service technician at the intervals indicated. Service information and supporting specifications are provided in the Owner's Guide.

Any adverse condition should be brought to the attention of your dealer or qualified service technician as soon as possible for the proper service advice. The owner maintenance service checks are generally not covered by warranties so you may be charged for labor, parts or lubricants used.

Maximum Oil Change Interval:

Normal Schedule: 7,500 miles or 6 months, whichever occurs first.

Special Operating Conditions: 5,000 miles or 6 months, see appropriate schedule.

Check every month:

- Check function of all interior and exterior lights
- Check tires for wear and proper air pressure
- Check engine oil fluid level
- Check windshield washer solvent fluid level
- Check and drain fuel filter/water separator

Check every six months:

- Check lap/shoulder belts and seat latches for wear and function
- Check air pressure in spare tire
- Check that externally-mounted spare tire is tight (see Owner's Guide)
- Check power steering fluid level
- Check washer spray, wiper operation and clean all wiper blades
- Check parking brake for proper operation
- Check and lubricate all hinges, latches and outside locks
- Check and lubricate door rubber weatherstrips
- Check and clean body and door drain holes
- Check safety warning lamps (brake, ABS, air bag, safety belt) for operation
- Check cooling system fluid level and coolant strength
- Check battery connections and clean if necessary
- Check clutch fluid level, if equipped

NORMAL SCHEDULE

The following section contains the "Normal Schedule." This schedule is presented at specific mileage intervals with exceptions noted.

Additional information available on the Web

To learn more about the importance of routine and dealer-performed maintenance on your vehicle, please visit the Ford Customer Service website. You'll also find important warranty information, customer assistance, technical expertise, frequently asked questions and much more. The website location is at: www.ford.com/

Then go to the service pick at the web site.

12,000 km (7,500 miles)

- Change engine oil and replace oil filter
- Inspect tires for wear and measure tread depth
- Rotate tires
- Inspect engine air filter

24,000 km (15,000 miles)

- Change engine oil and replace oil filter
- Inspect tires for wear and measure tread depth
- Rotate tires
- Inspect engine air filter
- Replace engine- and frame-mounted fuel filters
- Inspect steering linkage, suspension and, if equipped, driveshaft and ball joints
- Inspect engine cooling system and hoses
- Inspect brake system
- Inspect exhaust system and heat shields
- Check wheels for end play and noise
- Inspect and lubricate 4x2 ball joints (except F-450/F-550)
- Inspect and lubricate steering idler arms
- Replace cabin air filter, if equipped
- Inspect half-shaft boots, if equipped

36,000 km (22,500 miles)

- Change engine oil and replace oil filter
- Inspect engine air filter

48,000 km (30,000 miles)

- Change engine oil and replace oil filter
- Inspect tires for wear and measure tread depth
- Rotate tires
- Replace engine air filter
- Replace engine- and frame-mounted fuel filters
- Inspect steering linkage, suspension and, if equipped, driveshaft and ball joints
- Inspect engine cooling system and hoses
- Inspect brake system
- Inspect exhaust system and heat shields
- Change automatic transmission fluid and external filter element
- Check wheels for end play and noise
- Inspect and lubricate 4x2 ball joints (except F-450/F-550)
- Inspect and lubricate steering idler arms
- Replace cabin air filter, if equipped
- Inspect half-shaft boots, if equipped

60,000 km (37,500 miles)

- Change engine oil and replace oil filter
- Inspect engine air filter

72,000 km (45,000 miles)

- Change engine oil and replace oil filter
- Inspect tires for wear and measure tread depth
- Rotate tires
- Inspect engine air filter
- Replace engine- and frame-mounted fuel filters
- Inspect steering linkage, suspension and, if equipped, driveshaft and ball joints
- Inspect engine cooling system and hoses
- Inspect brake system
- Inspect exhaust system and heat shields
- Check wheels for end play and noise

- Inspect and lubricate 4x2 ball joints (except F-450/F-550)
- Inspect and lubricate steering idler arms
- Replace cabin air filter, if equipped
- Inspect half-shaft boots, if equipped

84,500 km (52,500 miles)

- Change engine oil and replace oil filter
- Inspect engine air filter

96,500 km (60,000 miles)

- Change engine oil and replace oil filter
- Inspect tires for wear and measure tread depth
- Rotate tires
- Replace engine air filter
- Replace engine- and frame-mounted fuel filters
- Inspect steering linkage, suspension and, if equipped, driveshaft and ball joints
- Inspect engine cooling system and hoses
- Inspect brake system
- Inspect exhaust system and heat shields
- Change automatic transmissio fluid and external filter element
- Change manual transmission fluid
- Check wheels for end play and noise
- Lubricate 4x4 hub needle bearings
- Lubricate 4x2 wheel bearings
- Replace wheel bearing grease seal
- Inspect and lubricate 4x2 ball joints (except F-450/F-550)
- Inspect and lubricate steering idler arms
- Replace cabin air filter, if equipped
- Inspect half-shaft boots, if equipped

108,000 km (67,500 miles)

- Change engine oil and replace oil filter
- Inspect engine air filter

121,000 km (75,000 miles)

- Change engine oil and replace oil filter
- Inspect tires for wear and measure tread depth
- Rotate tires
- Inspect engine air filter
- Replace engine- and frame-mounted fuel filters
- Inspect steering linkage, suspension and, if equipped, driveshaft and ball joints
- Inspect engine cooling system and hoses
- Inspect brake system
- Inspect exhaust system and heat shields
- Check wheels for end play and noise
- Inspect and lubricate 4x2 ball joints (except F-450/F-550)
- Inspect and lubricate steering idler arms
- Replace cabin air filter, if equipped
- Inspect half-shaft boots, if equipped

133,000 km (82,500 miles)

- Change engine oil and replace oil filter
- Inspect engine air filter

145,000 km (90,000 miles)

- Change engine oil and replace oil filter
- Inspect tires for wear and measure tread depth
- Rotate tires
- Replace engine air filter
- Replace engine- and frame-mounted fuel filters
- Inspect steering linkage, suspension and, if equipped, driveshaft and ball joints
- Inspect engine cooling system and hoses
- Inspect brake system
- Inspect exhaust system and heat shields
- Change automatic transmissio fluid and external filter element
- Check wheels for end play and noise

- Inspect and lubricate 4x2 ball joints (except F-450/F-550)
- Inspect and lubricate steering idler arms
- Replace cabin air filter, if equipped
- Inspect half-shaft boots, if equipped

157,000 km (97,500 miles)

- Change engine oil and replace oil filter
- Inspect engine air filter
- Inspect accessory drive belt(s)
- Change rear wheel drive (RWD) axle fluid - DANA axles using synthetic fluid only

170,000 km (105,000 miles)

- Change engine oil and replace oil filter
- Inspect tires for wear and measure tread depth
- Rotate tires
- Inspect engine air filter
- Replace engine- and frame-mounted fuel filters
- Inspect steering linkage, suspension and, if equipped, driveshaft and ball joints
- Change engine coolant
- Inspect engine cooling system and hoses
- Inspect brake system
- Inspect exhaust system and heat shields
- Check wheels for end play and noise
- Inspect and lubricate 4x2 ball joints (except F-450/F-550)
- Inspect and lubricate steering idler arms
- Replace cabin air filter, if equipped
- Inspect half-shaft boots, if equipped

181,000 km (112,500 miles)

- Change engine oil and replace oil filter
- Inspect engine air filter

193,000 km (120,000 miles)

- Change engine oil and replace oil filter
- Inspect tires for wear and measure tread depth

- Rotate tires
- Replace engine air filter
- Replace engine- and frame-mounted fuel filters
- Inspect steering linkage, suspension and, if equipped, driveshaft and ball joints
- Inspect engine cooling system and hoses
- Inspect brake system
- Inspect exhaust system and heat shields
- Change automatic transmissio fluid and external filter element
- Change manual transmission fluid
- Check wheels for end play and noise
- Lubricate 4x4 hub needle bearings
- Lubricate 4x2 wheel bearings
- Replace wheel bearing grease seal
- Inspect and lubricate 4x2 ball joints (except F-450/F-550)
- Inspect and lubricate steering idler arms
- Replace cabin air filter, if equipped
- Inspect half-shaft boots, if equipped

205,000 km (127,500 miles)

- Change engine oil and replace oil filter
- Check air filter minder, replace filter as required

217,000 km (135,000 miles)

- Change engine oil and replace oil filter
- Inspect tires for wear and measure tread depth
- Rotate tires
- Inspect engine air filter
- Replace engine- and frame-mounted fuel filters
- Inspect steering linkage, suspension and, if equipped, driveshaft and ball joints
- Inspect engine cooling system and hoses
- Inspect brake system
- Inspect exhaust system and heat shields

- Check wheels for end play and noise
- Inspect and lubricate 4x2 ball joints (except F-450/F-550)
- Inspect and lubricate steering idler arms
- Replace cabin air filter, if equipped
- Inspect half-shaft boots, if equipped

229,000 km (142,500 miles)

- Change engine oil and replace oil filter
- Check air filter minder, replace filter as required

241,000 km (150,000 miles)

- Change engine oil and replace oil filter
- Inspect tires for wear and measure tread depth
- Rotate tires
- Replace engine air filter
- Replace engine- and frame-mounted fuel filters
- Inspect steering linkage, suspension and, if equipped, driveshaft and ball joints
- Inspect engine cooling system and hoses
- Inspect brake system
- Inspect exhaust system and heat shields
- Replace accessory drive belt(s)
- Change engine coolant
- Change automatic transmission fluid and external filter element
- Change rear wheel drive (RWD) axle fluid - DANA axles using synthetic fluid only
- Change transfer case fluid
- Check wheels for end play and noise
- Lubricate 4x2 wheel bearings
- Replace wheel bearing grease seal
- Inspect and lubricate 4x2 ball joints (except F-450/F-550)
- Inspect and lubricate steering idler arms
- Replace cabin air filter, if equipped
- Inspect half-shaft boots, if equipped

Exceptions

In addition, there are several exceptions to the Normal Schedule. They are listed below:

Yellow coolant

- 5 years or 100,000 miles - change yellow coolant (whichever comes first)
- After initial change - change yellow coolant every 3 years or 50,000 miles

Normal vehicle axle maintenance

Rear axles and power take off (PTO) units containing synthetic lubricant and light duty trucks equipped with Ford-design axles are lubricated for life. These lubricants are not to be checked or changed unless a leak is suspected, service is required or the axle assembly has been submerged in water. The axle and PTO lubricant should be changed anytime the axle and PTO have been submerged in water. Non-synthetic rear axle lubricants should be replaced every 3,000 miles or 3 months, whichever occurs first, during extended trailer tow operation above 21 Celsius (70 degrees Fahrenheit) ambient and wide open throttle for extended periods above 45 mph. The 3,000 mile lube change interval may be waived if the axle was filled with 75W140 synthetic gear lubricant meeting Ford specification WSL-M2C192-A, part number F1TZ-19580-B or equivalent. Add four ounces of additive friction modifier C8AZ-19B546-A (EST-M2C118-A) or equivalent for complete refill of Traction-Lok rear axles. The axle lubricant should be changed anytime an axle has been submerged in water.

F-450 and F-550 axle maintenance

Replace rear axle lubricant every 100,000 miles under normal driving conditions on all F-450 and F-550 commercial applications. For F-450 and F-550 trucks operated at or near maximum Gross Vehicle Weights, the rear axle lubricant should be replaced every 50,000 miles. In addition, this 50,000 mile schedule should be observed when the vehicles are operated under the Special Operating Conditions, where noted, beginning on page XX.

SPECIAL OPERATING CONDITIONS

Towing a trailer or using a camper or car-top carrier

Every 5,000 miles or 6 months: Change engine oil and replace filter

Every 15,000 miles: Inspect and lubricate 4x2 ball joints and steering idler arms

Every 30,000 miles: Lubricate 4x4 hub needle bearings

Every 60,000 miles: Change transfer case fluid

As required: Change manual transmission fluid

Extensive idling and/or low-speed driving for long distances as in heavy commercial use such as delivery, taxi, patrol or livery

Every 5,000 miles or 6 months: Change engine oil and replace filter

Every 5,000 miles: Inspect brake system. Inspect and lubricate 4x2 ball joints and steering idler arms

30,000 miles and 90,000 miles: Lubricate 4x2 wheel bearings. Replace wheel bearing grease seal.

Every 60,000 miles: Change transfer case fluid

As required: Replace cabin air filter, if equipped

Operating in dusty conditions such as unpaved or dusty roads

Every 5,000 miles or 6 months: Change engine oil and replace filter

Every 15,000 miles: Inspect and lubricate 4x2 ball joints and steering idler arms

Every 60,000 miles: Change transfer case fluid

As required: Replace cabin air filter, if equipped

Off-road operation

Every 5,000 miles or 6 months: Change engine oil and replace filter

Every 15,000 miles: Lubricate 4x4 hub needle bearings

Every 60,000 miles: Change transfer case fluid

As required: Inspect and lubricate 4x2 ball joints and steering idler arms. Replace cabin air filter, if equipped

Short trip in cold operating conditions

Every 15,000 miles: Inspect and lubricate 4x2 ball joints and steering idler arms

Every 40,000 miles: Change transfer case fluid

MAINTENANCE AND SERVICE RECORD

See an authorized dealer

This section of the guide is designed to allow your Ford or Lincoln Mercury dealer, or Ford or Lincoln Mercury Auto Care service center or other qualified service technician to record that the recommended service was completed at the appropriate mileage intervals. Be sure to ask your service provider to record the type of service rendered (Normal or Special Operating Conditions — SOC) each time service is performed.

Date: **Mileage:** **Normal** ☐ **SOC** ☐	**Dealer's Stamp:**

See corresponding mileage in maintenance schedule for services performed.

YELLOW COOLANT CHANGE RECORD

Date: _________ 3 Years + 3 Next Date or Current Mileage: 50,000 Miles + 50,000 Next Mileage:	Dealer's Stamp:

Date: _________ 3 Years + 3 Next Date or Current Mileage: 50,000 Miles + 50,000 Next Mileage:	Dealer's Stamp:

Date: _________ 3 Years + 3 Next Date or Current Mileage: 50,000 Miles + 50,000 Next Mileage:	Dealer's Stamp:

Date: _________ 3 Years + 3 Next Date or Current Mileage: 50,000 Miles + 50,000 Next Mileage:	Dealer's Stamp: