Tech Tip

From your friends at New York Bus Sales

Product Effected –Units with CAT C7 engines

Complaint – ***When vehicle experiences a sudden stop as in a D.O.T. Service Brake Stop there is a momentary "beep" -***

Cause – ***Preliminary – We have found that thus far we have only seen this occur on the BBCV (Vision) product and that those exhibiting the issue have the "shallow" oil pan.***

Correction – ***We had issued the "Service Notice" below in 2008 and it should be reviewed-***
THIS IS NOT A FOOL PROOF REPAIR FOR THE CONDITION HERE BUT ONE WHICH MAY HAVE BEEN OVERLOOKED AND IF YOU EXPERIENCE THE ABOVE CONDITION SHOULD BE CHECKED FIRST –

EVEN AFTER RE-CALIBRATION AND LETTING THE UNIT WARM TO OPERATING TEMPERATURES THEN PERFORMING THE BRAKE TEST THERE HAVE BEEN SOME UNITS WHICH STILL EXPERIENCE THE ISSUE – BLUE BIRD AND CAT ARE STILL RESEARCHING TO RESOLVE THIS ISSUE AND WE WILL KEEP YOU UPDATED AS INFORMATION BECOMES AVAILABLE!

NEW YORK BUS SALES

Contact Our Service Department With Any Questions

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SERVICE NOTICE

CATERPILLAR C7 OIL CHANGE/CALIBRATION

We have recently had customers call looking for the proper oil capacity as during their initial oil change and filling the engine with oil the calibration of the dip stick appears to be off.
First you must determine if your engine has a deep pan or shallow pan. Below is the illustration showing the difference in the C7 pans.

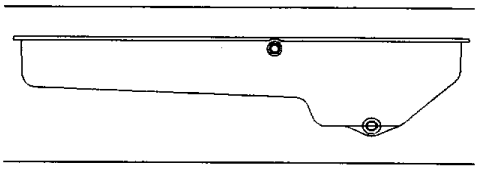

Illustration 30 g01272390
Shallow oil pan for a C7Engine

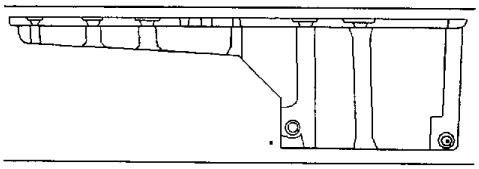

Illustration 31 g01230459
Deep oil pan for a C7 Engine

Next you must determine the proper refill capacity of your unit –
Please Note that these capacities include the engine mounted oil filter BUT NOT any added auxiliary oil filters.

UPDATE – WE HAVE DETERMINED THROUGH CAT AND BLUE BIRD THAT THE C7 ENGINES USED IN THE BLUE BIRD PRODUCT DO HAVE THE "DEEP" OIL PAN
BELOW IS "TABLE 4" LOCATED ON PAGE #114 OF THE CAT "OPERATION AND MAINTENANCE MANUAL" (PUBLICATION #SEBU8083-08) WHICH IS IN YOUR BLUE BIRD PRODUCT WHEN DELIVERED TO YOU

Table 4

Approximate Refill Capacities of the Engine Lubrication System	
Compartment or System	Refill Capacity[1]
C7 engine with a shallow sump	18 L (19 qt)
C7 engine with a deep sump	25 L (26.5 qt)
C9 engines	30 L (31.5 qt)

(1) Refill Capacity for the Engine Oil System and New Oil Filters

You can see that the proper "REFILL CAPACITY" is 26.5qt.

PLEASE NOTE THAT IS WITHOUT ANY ADDED/OPTIONAL OIL FILTERS

Check Calibration at the First Oil Change

The engine oil level will vary depending on the angle and the slant of the engine installation. The angle is the front to back tilt. The slant is the sideways tilt.

The oil level gauge markings must be verified in order to ensure that it is correct. Verify the oil level gauge markings at the first oil change.

Verify the "ADD" mark and verify the "FULL" mark that is on the oil level gauge. Use the following procedure.

NOTICE

The vehicle must be parked on a level surface in order to perform this maintenance procedure.

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1. Operate the engine until normal operating temperature is achieved. Stop the engine. Remove the crankcase oil drain plugs. The oil drain plug from the deep portion of the oil pan should be removed. Drain the oil from the crankcase for 20 minutes.

2. Remove the used oil filter(s). Install the new oil filter(s). Install the oil drain plugs and tighten to 70 ± 15 N·m (50 ± 11 lb ft).

Note: Your engine may be equipped with auxiliary oil filters. The auxiliary oil filters require a different volume of oil. Refer to the OEM specifications for the auxiliary oil filter.

3. Refer to the table that is correct for your engine and oil pan below. Pour quantity "A" of engine oil into the crankcase.

4. Allow enough time for the oil to drain into the crankcase. Approximately 20 minutes should be allowed. Check the oil level. Wait for several minutes and check the oil level again. Proceed after the oil level stops changing.

5. Check the oil level on the oil level gauge. The oil level should be at the "ADD" mark. If the oil level is not at the existing "ADD" mark, grind off the "ADD" mark and engrave the new "ADD" level. Use an engraving pen in order to engrave the new "ADD" mark.

6. Pour quantity "B" of oil into the crankcase. Allow enough time for the oil to drain into the crankcase.

7. Check the oil level on the oil level gauge. The oil level should be at the "FULL" mark. If the oil level is not at the existing "FULL" mark, grind off the "FULL" mark. Use an engraving pen in order to engrave the new "FULL" mark.

8. Pour quantity "C" of oil into the crankcase in order to allow oil to fill the oil filter.

NOTICE

Do not crank the engine for more than 30 seconds. Allow the starting motor to cool for two minutes before cranking again.

9. Start the engine and run the engine enough to ensure that the lubrication system is filled. Inspect the engine for oil leaks.

10. Stop the engine and allow enough time for the oil to drain into the crankcase.

11. Check the oil level on the oil level gauge. If the oil level is not at the calibrated "FULL" mark, fill the crankcase to the calibrated "FULL" mark. Record the amount of oil that was added as quantity D. Record the oil capacity of the lubrication system for future oil changes.

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact the skin.

NOTICE

The vehicle must be parked on a level surface for this maintenance procedure.

Do not drain the oil when the engine is cold. As the oil cools, suspended waste particles settle on the bottom of the oil pan. The waste particles are not removed with the draining cold oil. Drain the crankcase with the engine stopped. Drain the crankcase while the oil is warm. This draining method will allow the waste particles that are suspended in the oil to be properly drained.

Failure to follow this recommended procedure will cause the waste particles to be recirculated through the engine lubrication system with the new oil.

Drain the Engine Oil

After the engine has been run at the normal operating temperature, stop the engine. Attach a "DO NOT OPERATE" or a similar warning tag to the ignition keyswitch before the engine is serviced. Catch the oil in a suitable container. Recycle the used oil, or dispose of the used oil properly.

1. Remove the oil drain plug in order to allow the oil to drain.

2. After the oil has drained, the oil drain plug should be cleaned and installed.

   Tighten the oil drain plug to the following torque: ... 70 ± 15 N·m (50 ± 11 lb ft)

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Caterpillar Dealer Service Tool Catalog" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Note: Do NOT mix the used oil with the fuel. Dispose of the used oil according to local regulations.

Replace the Oil Filter

1. Remove the oil filter with a **185-3630** Chain Wrench .

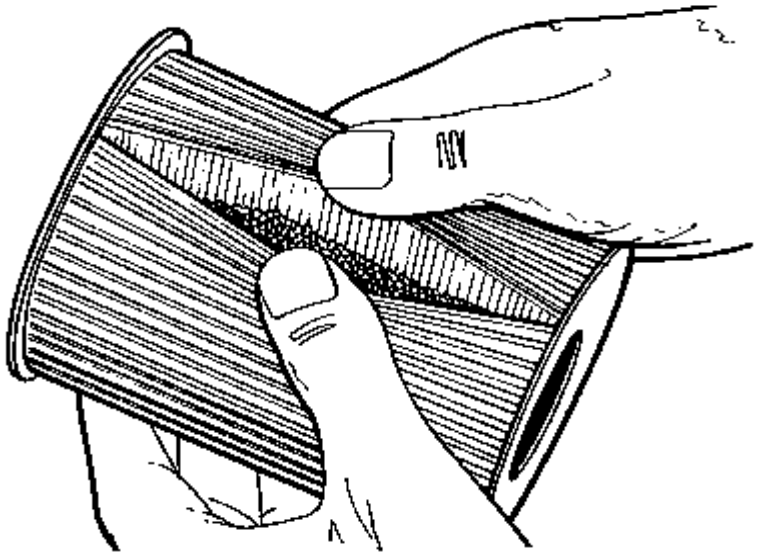

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Illustration 1

Element with debris

2. Cut the oil filter open with a **175-7546** Oil Filter Cutter . Break apart the pleats and inspect the oil filter for metal debris. An excessive amount of metal debris in the oil filter may indicate early wear or a pending failure.

   Use a magnet to differentiate between the ferrous metals and the nonferrous metals that are found in the oil filter element. Ferrous metals may indicate wear on the steel and cast iron parts of the engine.

   Nonferrous metals may indicate wear on the aluminum parts, brass parts or bronze parts of the engine. Parts that may be affected include the following items: main bearings, rod bearings, turbocharger bearings and cylinder heads.

Due to normal wear and friction, it is not uncommon to find small amounts of debris in the oil filter. Consult your Caterpillar dealer in order to arrange for a further analysis if an excessive amount of debris is found in the oil filter.

View Image

g00103713

Illustration 2

Typical filter mounting base and filter gasket

3. Clean the sealing surface of the filter mounting base. Ensure that the entire old oil filter gasket is removed.

4. Apply clean engine oil to the new oil filter gasket.

NOTICE

Do not fill the oil filters with oil before installing them. This oil would not be filtered and could be contaminated. Contaminated oil can cause accelerated wear to engine components.

5. Install the oil filter. Tighten the oil filter until the oil filter gasket contacts the base. Tighten the oil filter by hand according to the instructions that are shown on the oil filter. Do not overtighten the oil filter.

Fill the Engine Crankcase

1. Remove the oil filler cap. Refer to the Operation and Maintenance Manual, "Refill Capacities and Recommendations" topic for more information about selecting the correct engine oil. For finding the correct refill capacity for your engine, use the chart above. Fill the crankcase with the proper amount of oil.

NOTICE

If equipped with an auxiliary oil filter or system, extra oil must be added when filling the crankcase. Follow the OEM or filter manufacturer's recommendations. If the extra oil is not added, the engine may starve for oil.

NOTICE

To help prevent crankshaft or bearing damage, crank engine to fill all filters before starting. Do not crank engine for more than 30 seconds.

2. Start the engine and run the engine at "LOW IDLE" for two minutes. Perform this procedure in order to ensure that the lubrication system has oil and that the oil filters are filled. Inspect the oil filter for oil leaks.

3. Stop the engine and allow the oil to drain back to the sump for a minimum of ten minutes.

4. Remove the oil level gauge in order to check the oil level. Maintain the oil level between the "ADD" and "FULL" marks on the "ENGINE STOPPED" side of the oil level gauge.

Adjustments to the Oil Change Intervals

There are many circumstances under certain conditions that may allow an adjustment to the normal oil change interval. Many conditions that can affect the selection of the best oil change interval exist. The decision is based on the fundamental requirement that lubrication oil should be in an acceptable condition that provides continuous engine protection. The quality of the oil and amount of the oil that is available is balanced against the oil's ability to absorb by-products that are caused by combustion.

Due to the manufacturing tolerances, the engine application, and the maintenance variations, all engines do not consume fuel and oil at the same rate. The amount of fuel that is consumed is in direct relation to the maximum oil change interval that is selected. It is essential to include an S·O·S oil analysis before an adjustment of the oil change interval is considered. For more information on extending oil change intervals, contact your local Caterpillar dealer. An S·O·S oil analysis should be used to verify the adjustments to the oil change intervals. Table 1 can be used in order to determine the adjustments to the oil change intervals.

Table for Adjustments to the Oil Change Intervals

Note: Metric units are listed before English units.

Note: Use of table 1 assumes the use of a recommended oil type. See this Operation and Maintenance Manual, "Refill Recommendations and Capacities" article for further information.

1. Determine your type of vehicle application. Locate the column which lists your type of vehicle application.

2. Determine your available oil in liters or quarts. The oil quantity equals the sum of the capacities of the oil sump and the oil filter. Locate the row which lists your available oil.

3. The intersection of the column and the row lists the maximum permissible number of kilometers or miles between oil change intervals.

There are many applications of medium duty truck engines. Choose the maintenance interval that occurs first from the following list of maintenance intervals: mileage, fuel consumption, service hours and calendar time. **The interval that occurs first is the correct interval for changing your oil and for changing your oil filter.** It is important to understand the operation of your vehicle. Engines which operate in severe operating conditions may require more frequent maintenance.

Table 1

Permissible Oil Change Interval				
Oil Capacity of the Engine in Liters (quarts)	**Vehicle Applications**			
	Light Duty [1]	**Medium Duty** [2]	**Heavy Duty** [3]	**Severe Service** [4]
	KM (Miles) to Next Oil Change			
18 (20)	17380 (10800)	13905 (8640)	10430 (6480)	6950 (4320)
25 (26)	24140 (15000)	19300 (12000)	14500 (9000)	9660 (6000)

32 (34)	30900 (19200)	24720 (15360)	18540 (11520)	12360 (7680)

(1) Typical applications are recreational vehicles and intercity delivery (average that is greater than 10 mpg).

(2) Typical applications are intracity driving (average 8 to 10 mpg).

(3) Typical applications are bus services and pickup and/or delivery services (6 to 8 mpg).

(4) Refer to the Operation and Maintenance Manual, "Severe Service Application - Check" for the requirements (less than 6 mpg).

For more information on optimizing oil change intervals, see your Caterpillar dealer.