

**NO.: 02 TS - 20**

June 10, 2002

TO: All Distributors and Their Branches - Worldwide

ATTN.: Service Manager

FROM: G. W. Lysinger

SUBJECT: **Series 60 Wear Factors and Overhaul**

The Series 60 engine will provide long life for a customer if oil, coolant, and duty cycle are maintained properly. Obviously higher horsepower and higher duty cycle tends to increase all engine wear factors.

Gross vehicle weights greater than 80,000 pounds
Average miles per hour greater than 55 mph
Average load factor greater than 54%

As any or all of these factors increase, the amount of total fuel associated with engine life to overhaul will decrease. Guidelines for this type of engine life measurement, based on total fuel consumption, would be 75,000 gallons for applications operating above these factors and 125,000 gallons for applications operating below these factors. This information can be read from DDEC provided the ECM has never been changed, or it can be calculated from current trip data if the ECM is not the original.

There is an effect on engine life from a number of operational conditions. Increasing fuel use – load factor, increasing vehicle weight and increasing road speed all have an effect of reducing engine life to wearout. Even keeping these conditions to a minimum, eventually the engine will require an overhaul.

The following pages contain guidelines for dealing with customer concerns about wearout and guidelines for determining if an overhaul is required.

SERIES 60 ENGINE WEAROUT AND OVERHAUL

SERIES 60 ENGINE OVERHAUL CRITERIA

Provided is a list of nine criteria that bear heavily on whether or not an overhaul is recommended, and other information to assist in the determination of engine life with respect to wear.

An overhaul is recommended only if **at least six** of the following criteria are met:

- Blue smoke that continues at idle or under load for several days.
- White smoke, a thick white plume that continues for more than 60 seconds after engine start-up under ambient weather conditions between 20° F and 40° F.
- Low power on a dynamometer, less than 70% of the rated horsepower after allowing for driveline losses.
- Poor fuel economy, 20% worse than the fleet average.
- Hard starting in combination with excessive white smoke after starting.
- Low compression in the cylinders with readings below 350 PSI.
- High crankcase blowby above five inches of water column pressure measured at the dipstick tube.
- High oil consumption below 300 miles per quart.
- High wear metals in the oil analysis above engine trend line.

CUSTOMER ASSESSMENT AND INITIAL WEAROUT CHECKLIST

1. First and foremost, treat the customer with the utmost respect. Be prepared to compare the customer's expectations to the facts associated with wear.
2. Assess the symptoms and determine the nature.
3. Offer to check power as a means to determine overall engine condition.
4. Check for condition of turbocharger and air compressor.
5. Print out DDEC total fuel, average speed, and average load.

6. Record mileage.
7. Check for overhaul criteria.
8. If the assessment determines conditions are within specifications, advise the customer an overhaul is not required and the unit may be returned to service.

CRANKCASE PRESSURE GUIDELINES

1. Crankcase pressure: Full load, maximum KPa (in. H₂O) operating limits @ Rated speed = 1.25 KPa (5.0 inches H₂O column).

Note: New engine from DDC production line would typically represent a reading of (1.6 to 2 inches H₂O column).

2. Detroit Diesel has been receiving inquiries about the condition of Series 60 engines that exhibit crankcase pressure beyond the limits specified in the Series 60 Service Manual, publication 6SE483 when examined at time of vehicle trade. In some cases customers are concerned there is no clear description of what conditions to expect and in the extreme case, an overhaul is done based on high crankcase pressure measurement when a simpler repair may have remedied the condition and saved the customer a large sum of money.
3. When a Series 60 engine has high crankcase pressure, but yet the engine pulls good power, the high crankcase pressure could be telling us any one of the following potential conditions exist in the engine:
 - Breather obstruction
 - Worn or damaged air compressor
 - Worn turbocharger seals
 - Worn or broken compression rings
 - Worn or broken oil control rings
 - Worn valve guides

OIL CONSUMPTION GUIDELINES

Refer to Operator's Guide, Page 31, P/N 6SE484 - date 0106

All diesel engines are designed to use some oil, so the periodic addition of oil is normal. See Figure 12 below, "Engine Oil Consumption Guidelines" to determine the degree of oil usage.

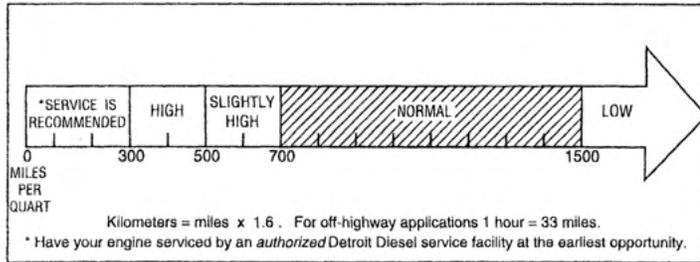


Figure 12. Engine Oil Consumption Guidelines

Items to check:

- Mis-calibrated dipstick
- External oil leaks
- Air compressor leak
- Turbocharger leak
- Valve guide seals

Item to be completed by Owner:

- Fully completed “Oil Consumption Sheet”

HEAVY FUMES/VAPOR FROM CRANKCASE BREATHER

Questions to ask customer:

1. What brand name of oil are they using?
2. What is oil change interval?

It may be necessary for customer to change oil brand and oil change interval and recheck for reoccurring problem:

Note: refer to pages 9-11 in the DDC Lubricating Oil, Fuel & Filters booklet for recommended:

- Brand Name Approved Lubricants
- Oil Change Intervals

Also, refer to page 26 “Statement of Detroit Diesel Corporation Warranty”

SERIES 60 CYLINDER LINER WEAR

Cylinder scuffing is a transfer of metal from piston to liner I.D. If this occurs during the engine warranty, it is generally a covered repair. Repair expense for normal cylinder liner wearout is not covered under P-3.

From the Detroit Diesel Series 60 "P3" Power Protection Plan Agreement under C. COVERAGE LIMITATIONS, item #10 reads as follows:

Cylinder liner, piston and piston ring failures attributable to wear-out are specifically excluded from this agreement. The wear rate of parts in any engine, and especially those parts within the combustion area, will vary depending on operating conditions and environment. Conditions such as load, trailer configuration, road speed and road conditions, as well as the quality of air, fuel, lube oil and lube oil filters bear a direct relationship to the wear rate and resulting life of parts. Depending upon the severity of these various conditions, parts wear and resulting failure could occur within the limitations of this coverage.

G. W. Lysinger
Customer Assurance