



## **Engine Oil Sludging on 1992-2003 Mercedes Benz 1.8L M111 Engines**

The AERA Technical Committee offers the following information on engine oil sludging on 1992-2003 Mercedes Benz 1.8L M111 engines. This information should be considered anytime an engine is being evaluated for oil consumption or a drivability concern.

The reason for this technical bulletin is to supply information on how to determine the degree or level of oil sludge accumulation within this engine. It should be realized some buildup of unburned carbon/oil particles are not detrimental to engine operation. This information is detailed in four sections supplied below.

Note: Severe oil sludging is defined as caking of oil onto engine components, in bores and oil passages. Minor oil sludging is defined as when the engine oil starts to thicken but still flows. Please refer to Figure 1.

- A. Symptoms of Engine Oil Sludging
- B. Engine Oil Sludging Causes
- C. Remedy for Minor Engine Oil Sludging
- D. Remedy for Severe Engine Oil Sludging

### **A. Symptoms of Engine Oil Sludging**

- Excessive engine oil consumption
- White/blue engine smoke
- Has an effect on the oil level indicator
- Engine oil filter is clogged; engine oil has thickened to a jelly-like consistency
- Oil sludge is visible when removing oil filter, engine valve covers, oil filler cap, cam positioning sensor.

### **B. Engine Oil Sludging Causes**

The causes listed below may individually, or in combination lead to engine oil sludging:

1. Crankcase ventilation system is not functioning, or mechanically blocked openings, bores, passages in cylinder valve cover, cylinder head, crankcase etc. are mechanically blocked. Nonfunctioning crankcase ventilation increases the load of the engine oil due to organic nitrates. Thus, the risk of oil sludging increases.
2. All engine oil drain passages on the cylinder head and crankcase and all engine ventilation ducts are not open. Engine crankcase breather hoses might be kinked. All ventilation bores in the engine valve covers not open.



3. Engine oil being used does not meet the engine oil requirement list as noted in the Approved Service Products Book (MB Sheet 229.1, 229.3 or 229.5. Additives such as those with dirt carrying properties, acid neutralizing properties and the oxidation stability, along with the quality of the oil base stock, affect when and if oil sludging occurs. MB Sheet 229.1, 229.3 or 229.5 list the tested and approved engine oils which provide the best protection against sludge formation.
4. Oil sludging can occur after the use of special fuels or the addition of an oil additive. Please inform your customers not to use any special additives with the fuel or engine oil, see current issue of: "Factory Approved Service Products" book (S-0473-04B).
5. Engine oil change intervals are not observed, please observe engine oil and oil filter change intervals.
6. Fuel grade is not within the octane index of 91. If contaminated, then fuel octane is reduced, engine sludging may start even if approved engine oil is used.
7. Engine antifreeze which leaks into the crankcase via an internal engine coolant leak such as leaky head gasket or casting porosity will cause the engine oil to form sludge within a short period of time. As a result, the crankcase ventilation system becomes clogged, then inoperative. Determine cause of the engine coolant leak and eliminate the cause of the coolant leak. Clean especially all engine components, as well as engine parts that have engine oil sludge present. If the condition re-occurs, it can be assumed that a casting is porous, for example: the engine crankcase (block), replace porous component.

### **C. Remedy for Minor Engine Oil Sludging (see Figure 1 to identify level Oil Sludging)**

1. Change engine oil and filter, using only approved engine oils as indicated in current issue of: "Factory Approved Service Products" book (S-0473-04B).
2. After performing step 1. above, perform engine oil purging by operating the engine for 1 hour in Park.  
**Note:** During engine purging, run the engine for 1 hour in "Park" position in a secured location outside the building.
3. Drain the engine oil after purging procedure above. If necessary, repeat purging above.  
**Note:** It is possible to have a maximum of 3 oil and oil filter changes on the same day of the repair date and a possible 4th oil and oil filter change on or before 6000 miles after the day of the repair date.
4. Refill drained engine with engine oils as noted in current issue of: "Factory Approved Service Products" book (S-0473-04B), and change oil filter.
5. Perform the first engine oil and filter change after purging at approx. 6,000 miles or before, refill using only engine oils listed in current issue of: "Factory Approved Service Products" book (S-0473-04B).



#### **D. Remedy for Severe Engine Oil Sludging (see Figure 1 to identify Minor and Severe Engine Oil Sludging)**

**Note:** Engines which display severe oil sludging, caking of oil onto engine components, in bores and oil passages, proceed as follows:

1. Disassemble engine and mechanically clean all bores, passages and engine components of any oil sludge or caked on oil residue.

**Note:** Perform cleaning by utilizing the hot tank cleansing system; otherwise perform manual cleaning of the engine and its components using parts cleaning solution; i.e.: soak all engine parts in cleaning solution for 1 hour. Remove oil sludge residue with parts cleaning brush and clear all oil circuit passages with compressed air.

2. Do not allow any hard oil sludge residue to enter the oil circuit, since the proper operation of the piston oil spray jets and hydraulic lifters, as an example, will be impaired.

3. Refill engine using only approved engine oils as listed in current issue of: "Factory Approved Service Products book (S-0473-04B), and change oil filter.

4. Perform next engine oil and oil filter change at approx. 6,000 miles, again refilling engine oil by using only the approved engine oils as indicated in current issue of: "Factory Approved Service Products" book (S0473-04B).



**Figure 1. The 3 Levels of Oil Sludge**