

Impact of Low Quality Oils on Engine Wear and Sludge Deposits

A Comparison of API SA and API SL (ILSAC* GF-3) Engine Oils

Alliance of Automobile
Manufacturers

8 Nov 2004

Rev 16 Dec 2004

*International Lubricant Standardization and Approval Committee



Alliance Members

BMW Group



DAIMLERCHRYSLER



mazda



PORSCHE

TOYOTA



Introduction

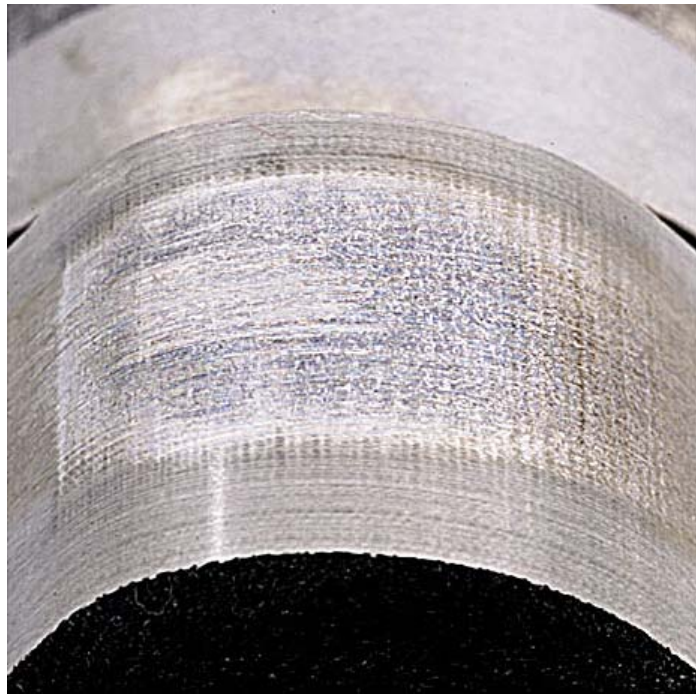
- Engine oils were first developed in the 1930s to protect the engines of that period. Their quality is equivalent to oils carrying an “API SA” designation.
- Automotive engine oils have improved a great deal since the 30s. Each new generation of oil quality has been designed to protect older as well as newer engines.
- Today’s oils are labeled as “API SL” and soon will be labeled “API SM” due to a category update. SA oils are obsolete for modern automotive engines. SA oils typically lack additives that protect modern engines, and they are likely to cause emissions to increase.
- Unfortunately, SA oils continue to be sold in the U.S. and may find their way into the hands of uninformed consumers. When consumers use SA quality oils in their modern engines, problems may occur. This presentation shows the likely impacts of this mistake.

Alliance SA Oil Test Program

- In 2004, the Alliance completed a test program to compare API SA oils with API SL oils.
 - The API SA oil used in the test program was purchased at a national chain auto parts store. This oil is readily available in many areas of the country.
 - The API SL oil used in the test program is a conventional “mineral oil” certified to meet all API SL engine oil requirements, including those for low temperature wear, deposits and sludge formation.
- The test program, which used API SL engine oil qualification tests (current at time of testing), generated the following results.

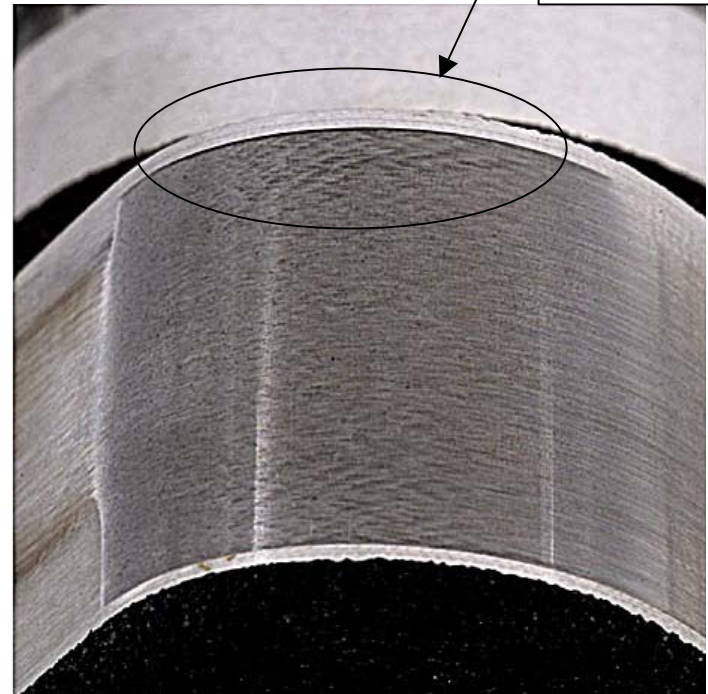
Low Temp. Valvetrain Wear (Seq. IVA) Test: Cam Wear

API SL (ILSAC GF-3): Pass



API SA: **Fail**

Note the wear
step

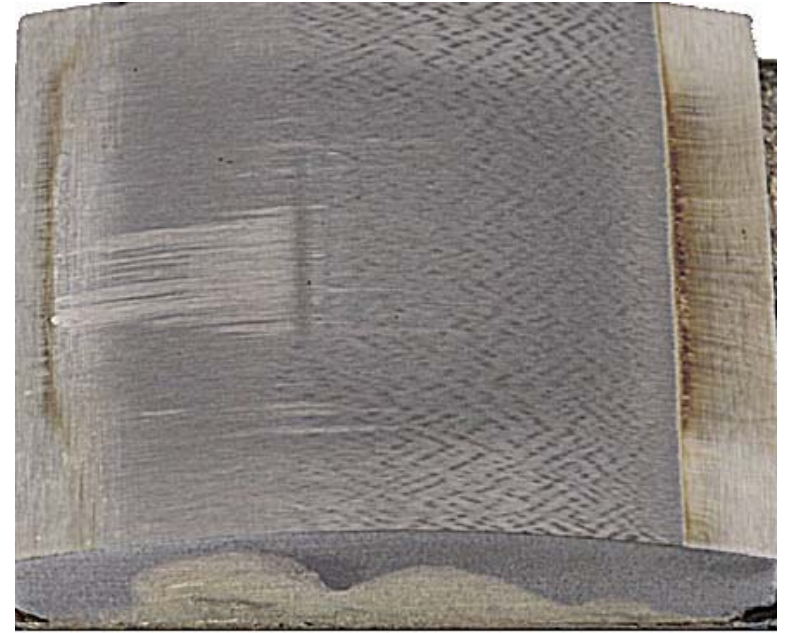


Low Temp. Valvetrain Wear (Seq. IVA) Test: Follower Wear

API SL (ILSAC GF-3):
Pass



API SA:
Fail



Note wear across the
entire width of the pad

Low Temp. Sludge/Deposit (Seq. VG) Test: Oil Pick-up Screen

API SL (ILSAC GF-3): Pass



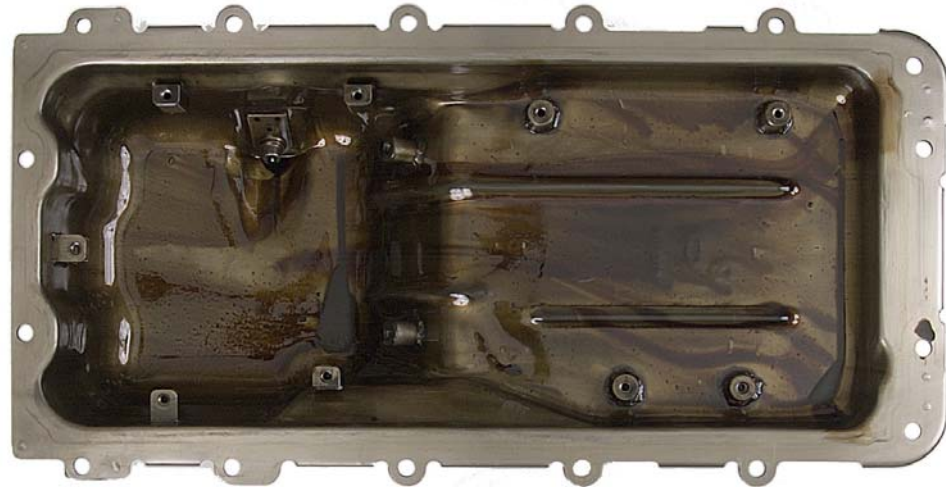
API SA: **Fail**

Completed only 168 hrs of 216
hour test.



Low Temp. Sludge/Deposit (Seq. VG) Test: Oil Pan

API SL (ILSAC GF-3): Pass



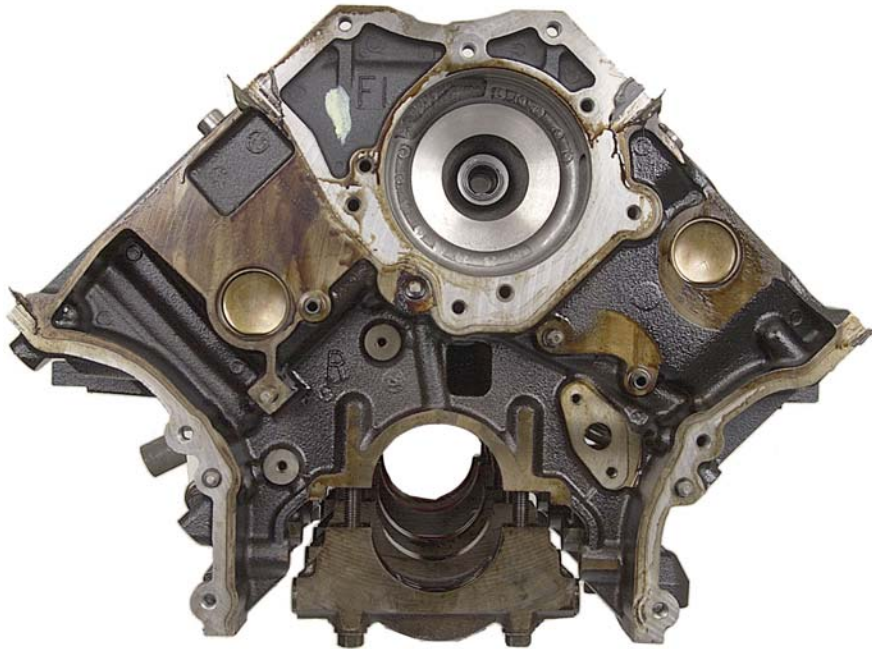
API SA: **Fail**

Completed only 168 hrs
of 216 hour test.



Low Temp. Sludge/ Deposit (Seq. VG) Test: Engine Block, Front

API SL (ILSAC GF-3):
Pass



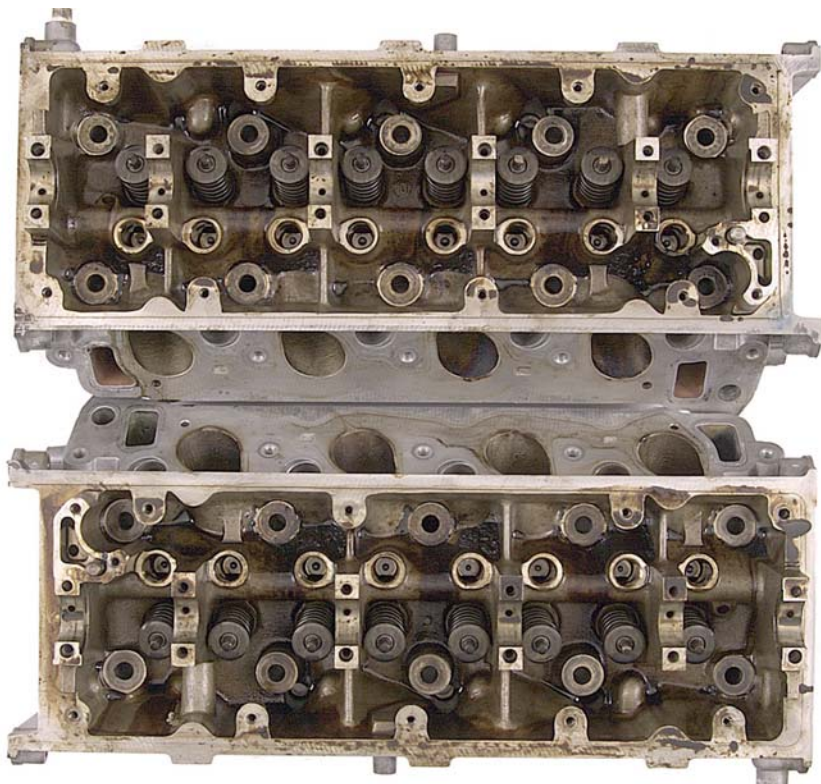
API SA: **Fail**

Completed only 168 hrs of 216
hour test.

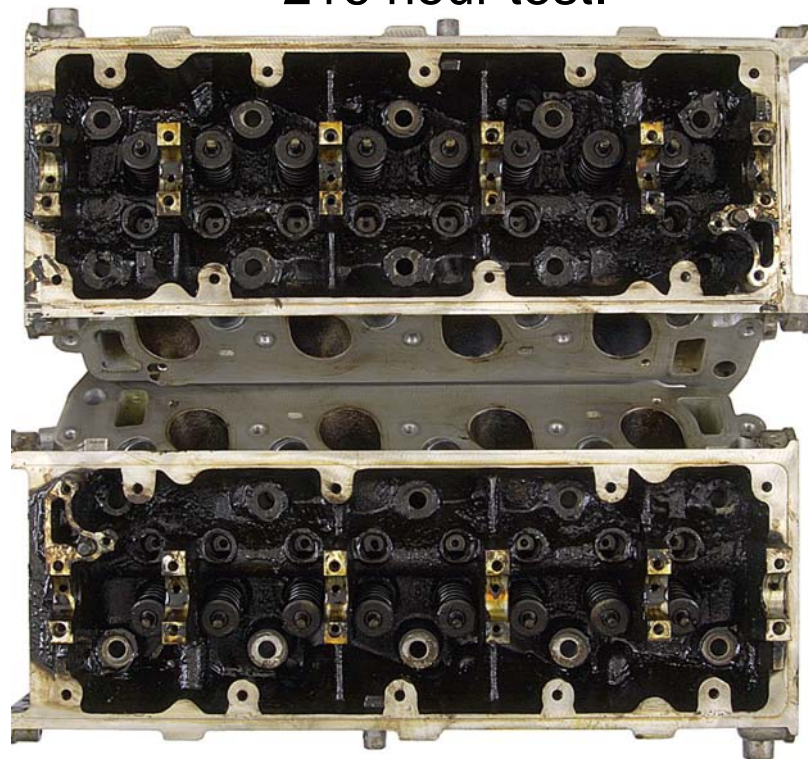


Low Temp. Sludge/Deposit (Seq. VG) Test: Cylinder Heads

API SL (ILSAC GF-3):
Pass



API SA: **Fail**
Completed only 168 hrs of
216 hour test.



Conclusions

- API SA oils are unlikely to pass any of the modern wear and deposit tests required for API SL (ILSAC GF-3) or current API SM (ILSAC GF-4) oils.
- Use of API SA oils is likely to cause serious damage (excessive deposits and high wear) in modern automotive engines, possibly leading to engine failure.
- Because low quality SA oils can increase wear and deposits, using them may lead to increased emissions.

Recommendations

- API, SAE, and other organizations should take steps to warn consumers of the dangers of using low quality engine oils (such as API SA oils) in their vehicles.
- States should exercise their authorities to ensure that consumers are not harmed by improperly using these oils. These actions could include new prohibitions, enhanced enforcement, new labeling requirements and store shelf notices.