9/5 Engine Oil Sludge 9/3

Engine oil sludge has been around since the internal combustion engines were invented. The problem has been controlled by the oil used and engine design. However this old problem has resurfaced in the last few years and is now upon us again. The following is copied from the Saab USA letter addressed to 9/3 and 9/5 owners about oil sludging (dated 6-3-05):

> *"The primary cause of engine oil sludge is premature decomposition of the oil due to a number of factors or combination of factors. These factors include: short driving trips of 5 to 10 minutes when the engine does not warm up sufficiently, driving in stop-and-go traffic, driving in dusty conditions, towing trailers, using low-grade-specification oil not recommended by Saab, or oil changes not meeting the minimum requirements as recommended in the service schedule. When these factors or combination of factors occur, the engine oil thickens making it more difficult to provide adequate engine lubrication."*

First, we need to emphasize that…..

Saab is not the only brand that is having some problems!

Check out the web story on-line at http://www.abcactionnews.com/stories/2005/02/050223oil.shtml and you will find that Saab is not even mentioned in the list of cars with sludging difficulties. Having said that, I will give you the short explanation of what is going on. There is detailed information on our web site and in the articles I have written for **NINES** magazine.

The 9/3 and 9/5 engines are "low friction" design engines. This design allows more impurities to escape from the cylinders and end up in the oil system. To combat this, the oil temperature is higher than previous engine designs. Oil coming in contact with metal that is over 400 degrees is one of the causes of this sludging process. With already very warm oil and low friction design which dictates hotter running pistons and a turbo to cool with hot oil aggravates the whole situation. Normally, when the oil starts to oxidize, it is neutralized by the oil additives/ anti-oxidants which are then removed by the oil filter. At a point, the slime/sludge in the system plugs the oil filter and all the contaminated oil is circulated throughout the oil system. To protect the low friction oil pump (that is less robust than its predecessors) a very fine screen is used in the oil pick-up. Because it has holes about .026 inches in size it does not take much to first restrict the flow to the pump and eventually cause excess wear in the pump and consequently to the whole engine. Lowered oil pressure and volume to the engine components causes more friction, which causes more heat; (about 40% of the engine heat is carried by the oil system and 60% by the engine coolant), that accelerates wear and creates more sludge!

Two or three years ago we saw very few engines that had a discernable sludge problem that we could identify. As time has gone by, we have seen an increasing problem. We have been doing our own research to find the cause and solution for almost a year. We know that Saab and GM know the problem and the solution but will not admit it so they don't have to deal with repairing all the at risk engines out there!

This photo shows the oil pump from a 9000 on the left and a 9/5 on the right. The 9000 oil pump was quite expensive to build but bullet proof. It was very dependable and just did not wear out. The 9/5 pump with the rotor type set-up is more prone to wear, causing low oil pressure to vital engine components. On the following page, the picture of the oil pick-up screens shows how we think Saab tried to protect the 9-5 pump.

We installed gauges on my 9/5 Aero and have been monitoring the oil pressure, oil temperature, turbocharger temperature and water temperature. We also have a computer monitoring system called Car Chip. Armed with the information provided by the gauges and the experience we have gained by working on many of the sludged engines, we have come up with a plan to combat the issue. ***Our plan is a case of being pro-active and finding solutions rather than playing dumb and just fixing broken engines without a word as to how to prevent the problems.***

There are a number of warning signs that we look for. The first is a noisy balance shaft or timing chain. They tend to wear out and sound the alarm if they are not getting enough lubrication. If we wait till this happens, it is potentially a costly repair. We needed to go back further and figure out how we could prevent the whole sequence from happening. The 9/3s and 9/5s were introduced when "dinosaur" engine oil was the norm with 10,000 mile change intervals. Synthetic oil was recommended by Saab only for sub-zero Farenheit operation.

It is now common knowledge that regular oil may create sludge even with 2-3000 mile oil changes, leading us to believe that the sludge sequence may have started when the cars were brand new.

The only way to prove effective oil change intervals is with oil analysis at a lab that we have been doing. The link in our investigation was accelerated when we were installing the oil temp sending unit in the oil pan of our Aero. We found that it had a sludge problem! My pampered Aero has had 4000 mile oil changes with Mobil I 10w30 synthetic oil for the 16,000 miles that I have owned it. It was evident when we removed the oil pan that the oil sludge is not removed merely by changing oil, even if done often, with synthetic oil. We cleaned the oil pan and pick-up screen, etc. and finished the gauge installation. When we started road testing the car, we found that the oil pressure alarm was ringing at idle. It appeared that the oil pressure was low on my engine. We put the shop oil pressure gauge on the car and found out that the new electric gauge we had installed read low. That was a relief, but the pressure was not as high as I would have hoped for. We then established a road test procedure to equalize the engine temps, drained the Mobil I 10w30 and saved it. We put regular oil in the engine so we could do an oil flush (with our B&G oil flush machine) and then re-installed the Mobil I oil to make the test again. Another road test showed that we had gained 3-4 lbs of oil pressure. Since we have been led to believe that the Mobil I 10w30 may not meet Saabs specs, we then installed 0w40 which does. We ran our standard road test and re-took all the readings. We gained another 3-4 lbs of oil pressure. With these changes my Aero now has great oil pressure and, I expect, a long and healthy life ahead of it!

The oil pick-up screen on the right is from a Saab 9000. Notice the size of the holes that the oil flows through compared to the screen on the left from a 9/5. We are theorizing the screen must be small in the 9/5 to protect the less robust oil pump .

The lump in the center of the picture is a sludge/sediment buildup that was under the oil pick-up screen. The pick-up screen has been turned in the picture, but when installed in its normal position, it was nearly plugged and the engine had very low oil pressure. We cleaned all these parts, serviced the balance shaft chain, did the oil flush, installed the Amsoil 5W40 and the car is now running great with oil pressure that is up to spec. It would have only taken a short while before this engine would have been destroyed.

With the experience we have gained and the results of our testing, we have started a new program to remove the existing sludge, prevent new sludge from forming, and extend engine life back to normal Saab standards. We developed a flow chart that you will see on the next page. We start with oil pressure (the heart of the issue) and go from there. Our step-by-step approach resolves the issues and the system really works.

We believe these measures are so important
that we are now completing them on all of our used cars.
The *Engine Health Certificate* is provided for all the 9/3 and 9/5 cars that we sell.

This increases our costs but we think it is a real value to the new owner. Once the engine is clean and using our recommended oil (5W40 Amsoil) with 5000 mile changes, the engine should last for a long, long time. Amsoil recommends longer change intervals but unless you do systematic oil analysis we think 5000 miles is a safe starting point. Long-term oil testing (which we are doing on my Aero) will prove what the limits are for driving in the Minnesota climate. We will keep you posted as the data is generated!

Please note that this has only been an overview of what we have found. Check out the **NINES** magazine articles or the **NINES** articles reprinted on our website. There is a wealth of information there. We will also post new information to our website as it becomes available.

FREE OIL PROGRAM

Included with all 9/3 or 9/5 Saabs purchased at Andrews Inc. in December 2005

50% Discount on the Oil Program

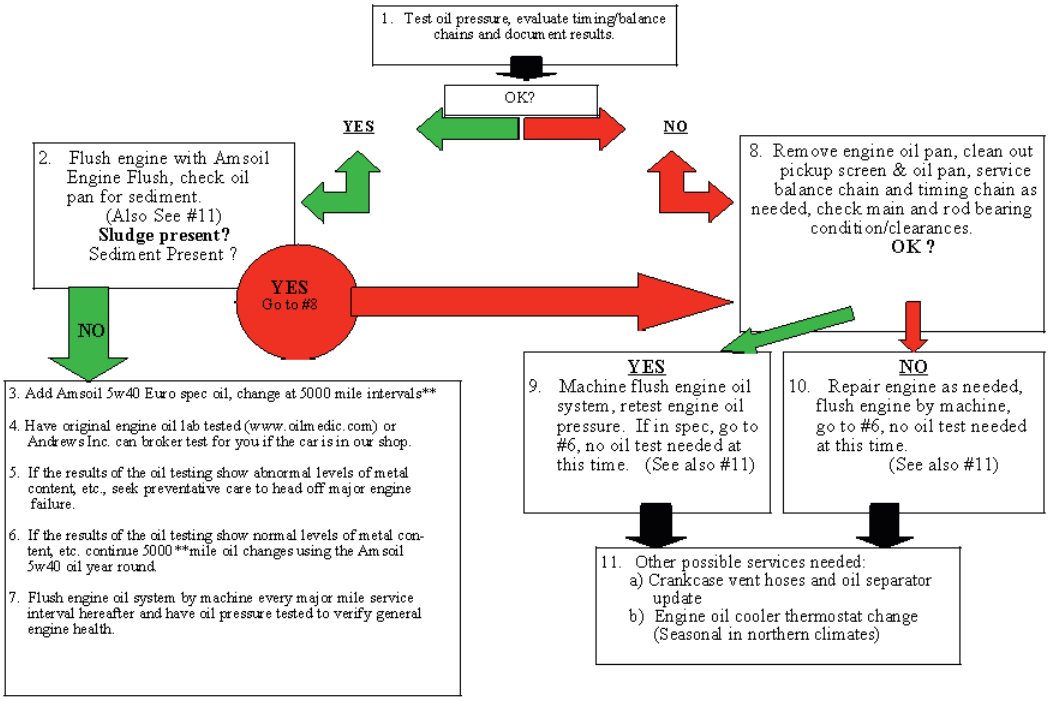
for 9/3 or 9/5 Saabs purchased from us between Jan. '05 and Nov. '05

25% Discount offered on the oil program

for 9/3 or 9/5 Saabs purchased at Andrews Inc. before 2005

Step 1 on the flow chart is just $120 at regular price.
Oil program prices depend on the services needed.
Discounts good on work scheduled by 4/15/06

RECOMMENDED SERVICE
9/5 4 cylinder models 1999-2003 and 9/3 models 1999-2002, 2003 CV



****Oil change intervals may be extended beyond 5000 miles as indicated by oil analysis results from your car.**

Who Needs Our Oil Program ?

1. **Anyone who has gone over mileage on an oil change interval with a 9/3 or 9/5**
2. **Anyone who has used natural oil at anytime in the life of their 9/3 or 9/5**
3. **Anyone who does not know the maintenance history of their 9/3 or 9/5**
4. **Everyone desiring maximum life out of their 9/3 or 9/5 engine.**

Engine Health Certificate

THIS CERTIFICATE IS AWARDED TO

2002 Saab 9/5 Linear | YS3EB49E323008108 | Stock #2530

ENGINE COMPRESSION:

#1_____ #2_____ #3_____ #4_____ #5_____ #6_____

TIMING CHAIN EXTENSION: (4-Cylinder only) _____Maximum15mm

TIMING BELT REPLACED AT _____MILES_____Due_____Miles

ENGINE OIL PRESSURE:

_____psi at hot idle (12 psi is minimum)

_____psi at 2000 rpm (36 psi is minimum)

_____No oil sediment, oil system flushed, conversion to Amsoil 5w40 performed.

_____Found sediment, oil system flushed, conversion to Amsoil 5w40 performed.

_____Oil pressure did not meet minimum spec. Repaired as follows:

AFTER REPAIR OIL PRESSURE: _____psi at hot idle, _____psi at 2000 rpm.

For optimum engine health perform 5W40 Amsoil and filter changes every 5k miles or 5 months

STRESS-FREE SHOPPING

All pre-owned Saab 9/3 and 9/5 cars offered for sale here at Andrews Inc. will have one of these certificates to prove it's value. Why would you buy a car without knowing it's true condition? Avoid the stress of shopping for a used car by buying a pre-owned car at Andrews Inc.

WE CARE!

RECOMMENDED SERVICE
9/5 4 cylinder models 1999-2003 and 9/3 models 1999-2002, 2003 CV

1. Test oil pressure, evaluate timing/balance chains and document results.

OK?

YES

2. Flush engine with Amsoil Engine Flush, check oil pan for sediment. (Also See #11)
Sludge present?
Sediment Present ?

YES
Go to #8

NO

3. Add Amsoil 5w40 Euro spec oil, change at 5000 mile intervals**

4. Have original engine oil lab tested (www.oilmedic.com) or Andrews Inc. can broker test for you if the car is in our shop.

5. If the results of the oil testing show abnormal levels of metal content, etc., seek preventative care to head off major engine failure.

6. If the results of the oil testing show normal levels of metal content, etc. continue 5000**mile oil changes using the Amsoil 5w40 oil year round.

7. Flush engine oil system by machine every major mile service interval hereafter and have oil pressure tested to verify general engine health.

NO

8. Remove engine oil pan, clean out pickup screen & oil pan, service balance chain and timing chain as needed, check main and rod bearing condition/clearances.
OK ?

YES

9. Machine flush engine oil system, retest engine oil pressure. If in spec, go to #6, no oil test needed at this time. (See also #11)

NO

10. Repair engine as needed, flush engine by machine, go to #6, no oil test needed at this time.
(See also #11)

11. Other possible services needed:
a) Crankcase vent hoses and oil separator update
b) Engine oil cooler thermostat change (Seasonal in northern climates)

****Oil change intervals may be extended beyond 5000 miles as indicated by oil analysis results from your car.**