

Engine - Lubrication System Contamination Cleaning

NO: 20-05

DATE: 1-31-2007

MODEL: All Models

YEAR: 1999-

SUBJECT:

Procedure for Cleaning Engine Oil System Contamination.

REFERENCE: VIDA

DESCRIPTION:

Material	Quantity	Part No.
ACEA A1/B1,SAE 5W-30 Synthetic oil	*	
Oil filter	1	*
Oil decal	1	30748024
Oil trap	**	*
Hose, oil trap/engine block	**	*
Oil sump	**	*
Big-end bearing	**	*
Cylinder head gasket	**	*
Liquid gasket	**	*
Camshaft seal	**	*
Induction gasket	**	*
Manifold gasket	**	*
Valve stem seal	**	*
VVT solenoid filter	**	*
Oil suction line	**	*
Oil pressure switch	**	*
Pressure oil line (turbo)	**	*

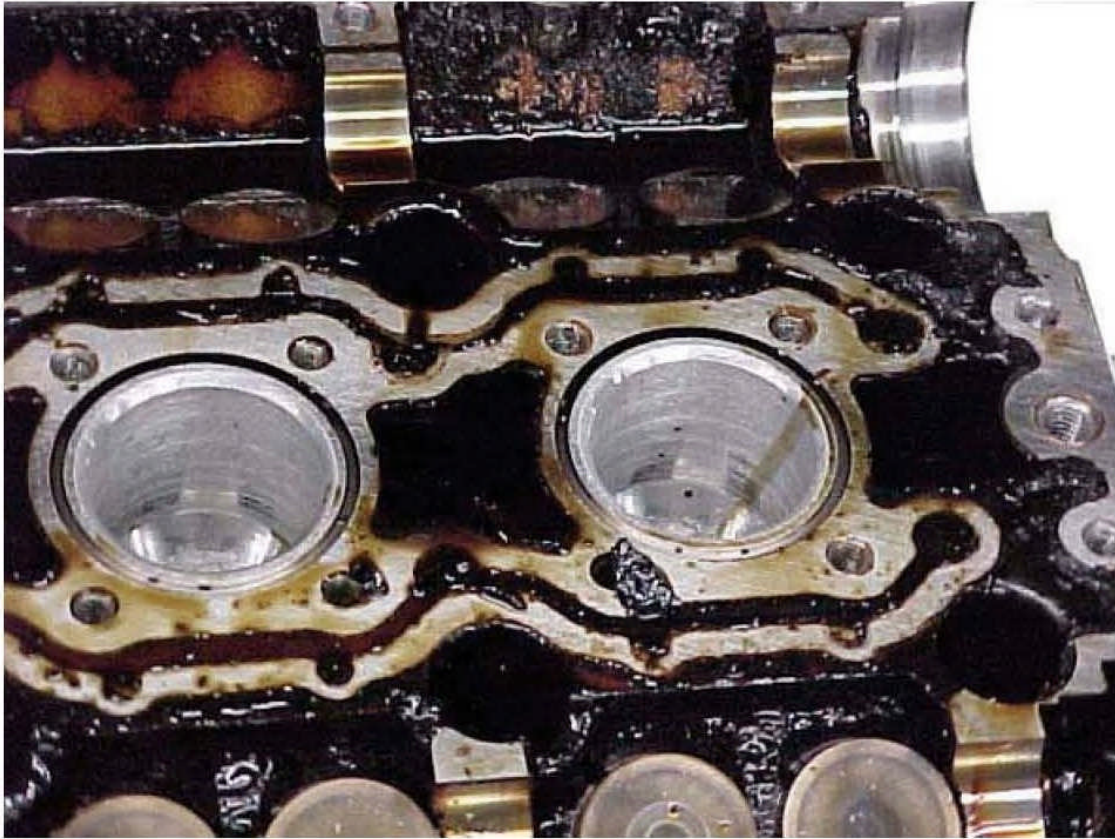
* depending on variant

** depending on diagnosis and variant

This TNN provides the customer with an alternative lower cost repair rather than engine replacement. It may be required to perform such cleaning if the engine has been contaminated due to the use of engine oil additives, use of engine oils that do not meet the manufacture's requirements, or not following the manufacture's recommended oil change intervals. Any engine related damage caused by the conditions stated is not considered warrantable.

SERVICE:

Introduction



One or more of the following conditions could cause the engine oil to thicken and leave deposits in the engine:

- wrong oil grade, quality and/or viscosity
- cars driven too many miles between oil changes
- cars frequently driven short distances with many cold starts
- excessive idling
- fuels of low quality and/or with high alcohol content
- additives added to oil or fuel
- high ambient temperature
- high air humidity

Symptom

Possible symptoms are indicated as follows:



- Illuminated oil pressure lamp. Due to clogged oil suction strainer to [oil pump](#) and/or [oil filter](#) (see illustration)

- Noise (whistling)

Noise due to high pressure in crankcase. Stops when the oil filler cap is removed. For model year 99-02, see TNN 25-149B

- Poor driveability

Clogged crankcase ventilation can reduce the engine performance

- Uneven/oscillating idling

Caused by clogged crankcase ventilation.

- Oil leak

from engine seals due to restricted crankcase ventilation

- Noise (knocking)

Low oil pressure can cause premature bearing wear

- High oil consumption / noise from turbo.

Damaged bearing or seals in the turbo can cause these symptoms

If one or more of these symptoms presents itself, and an extremely dirty oil filler cap or screen is found, troubleshoot in the following order.

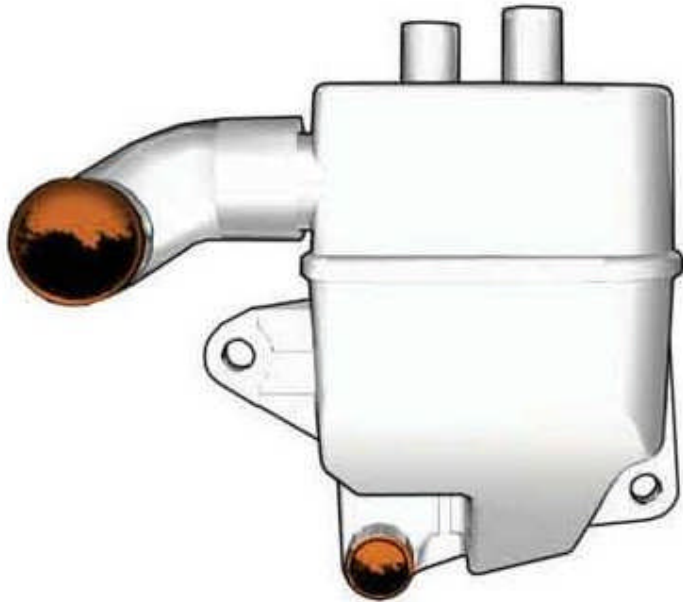
Diagnostics



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The first step is to inspect the [oil filter](#) to see if it is abnormally dirty. An abnormally dirty filter is easily recognized by its thick, black deposits. Engines with spin-on [oil filters](#) can be inspected by sawing the filter in half.

Oil trap check



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If the engine has a problem with carbon deposits, the passageways in the engine block and oil trap may be completely or partially clogged. See illustration. Remove and check the oil trap, hoses and their passageways in the engine block. There should not be any major collections of carbon deposits in the hoses or in the passageways in the block.

Oil sump/crankcase check

See information in VIDA for engine variant in question.

Drain the engine oil.

Remove the oil sump and check the oil sump and crankcase for deposits.

Normally, there should not be any deposits. A slight light brown discoloration is however normal.



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The figures show an engine with heavy deposits.

Check the suction strainer on the oil suction line for contaminants and deposits.

If no trace of deposits has been found, no further checks are necessary and fault tracing can be considered complete.

If deposits have been detected in any of the above steps, follow the instructions below to remedy the problem.



Checking big-end bearings

See information in VIDA for engine variant in question.

Note! Mark the position of the big-end bearing caps.

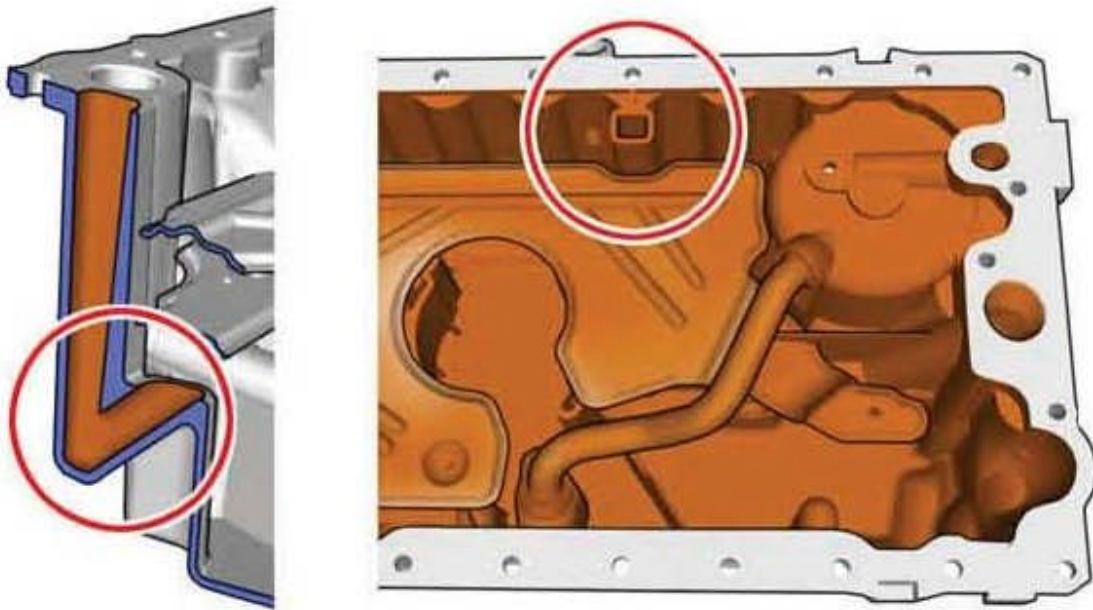
Remove and check the big-end bearings for cylinder 2.

If the bearings are undamaged, reinstall the bearings and caps as marked.

If big-end bearing no.2 is damaged, replace all big-end bearings.

Note! If any bearing is damaged, check the [crankshaft](#) for scratches.

If the [crankshaft](#) is damaged, discontinue troubleshooting and replace the engine.



Cleaning the oil sump

Clean the inside of the oil sump by removing any loose deposits.

Note! Make sure that the oil sump passageway from the oil trap is fully cleaned. See illustration. Blow clear with compressed air to ensure the duct is thoroughly cleaned.

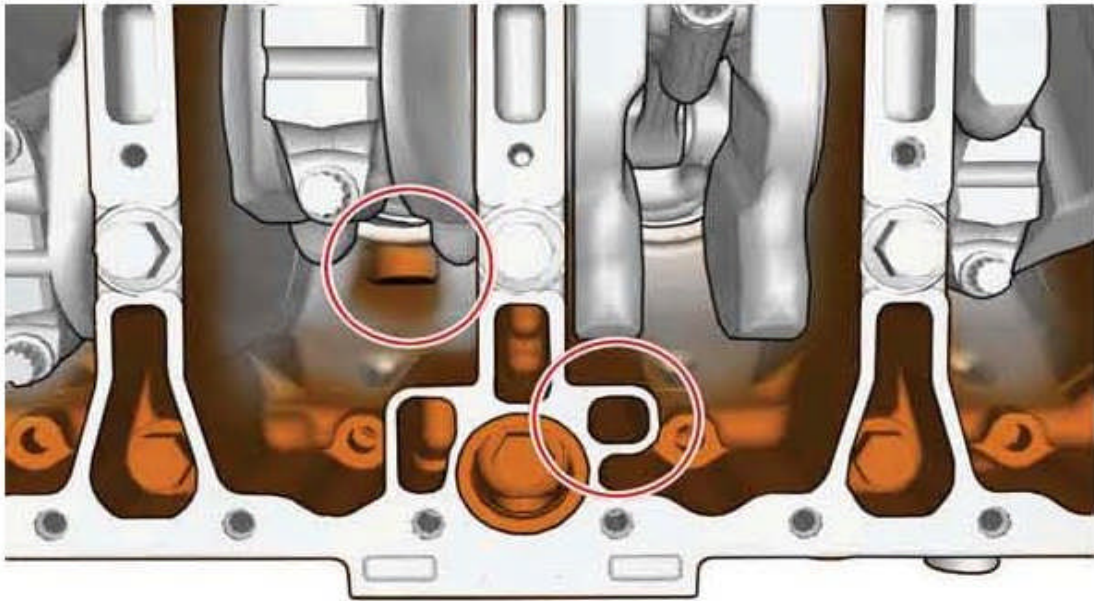
Then clean the oil sump as described in the next step.

If it is not possible to properly clean the oil sump, oil sump replacement should be considered.

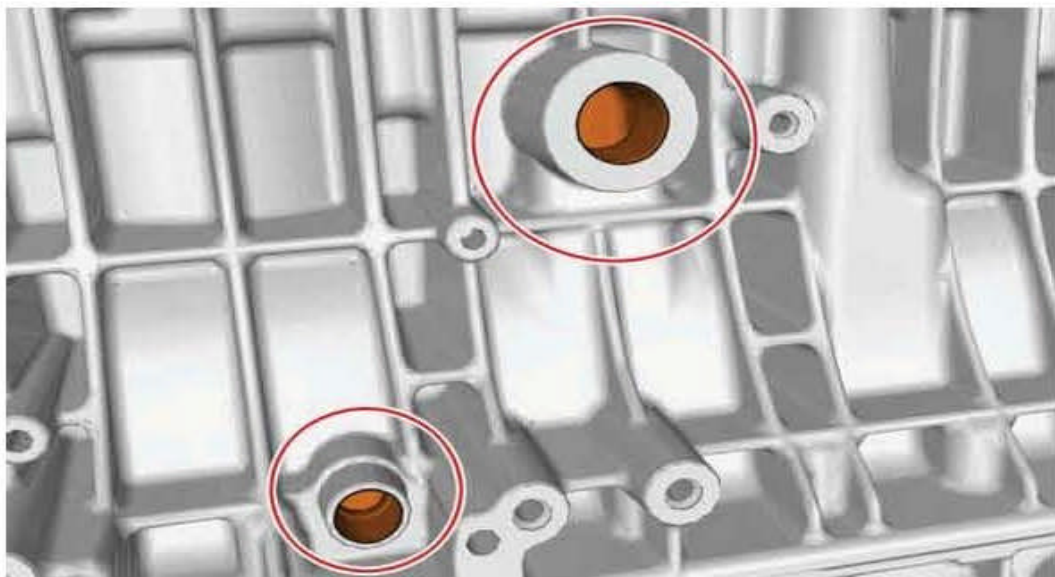
Cleaning/Washing

Washing should be done in a parts cleaning machine at no less than 70°C / 158°F for at least 30 minutes. Repeat if necessary. It is a good idea to change the position of the components several times during the cleaning/washing procedure.

Blow dry with compressed air after washing.



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Cleaning the engine block

Clean the engine block passageway from the oil trap and the oil trap passageway in the block. Use a screwdriver or similar small scraping tool and blow the passageways clean with

compressed air.

Perform a general cleaning of the crankcase to remove all the carbon deposits. All loose deposits must be thoroughly cleaned.

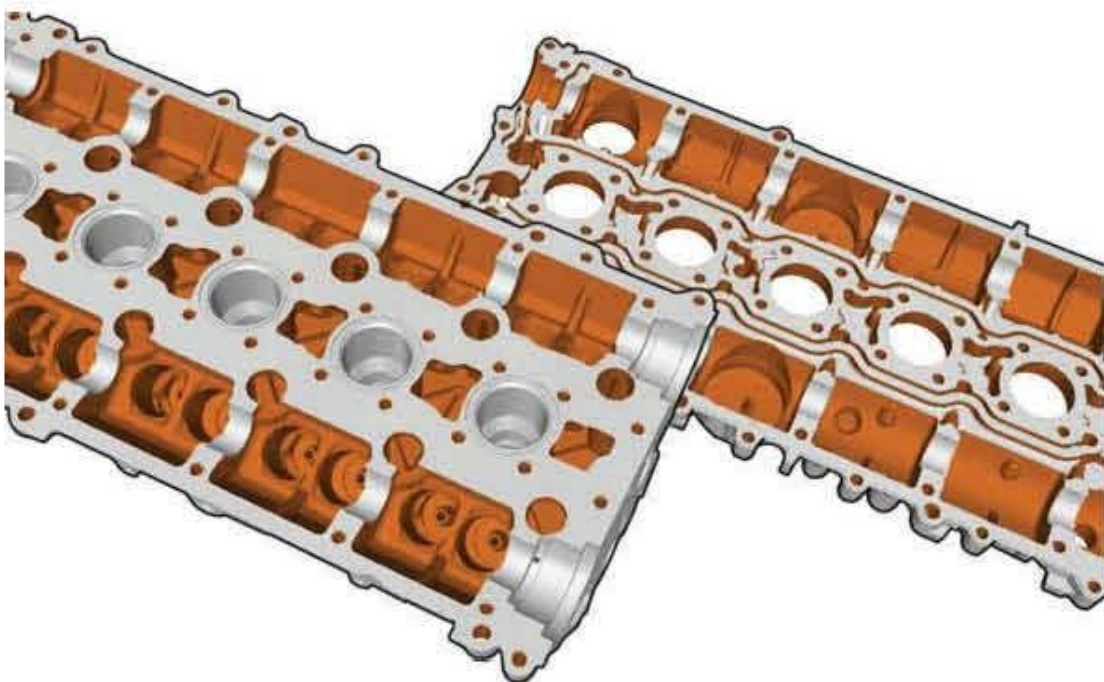
Cleaning cylinder head

Note! Remove the cylinder head from the engine before cleaning.

With the cylinder head removed from the engine. Use the information in VIDA for the variant in question.

Remove:

- valves
- springs
- valve stem seals.



Remove carbon deposits with a suitable tool, knife, scraper or the like. Then wash the cylinder head and cam carrier cover in a parts cleaning machine as described in step 8.

Note! The VVT (Variable Valve Timing) unit and VVT solenoid must not be washed in a parts cleaning machine. Blow clean only.

Caution! Be sure to lubricate the valve guides after washing in a parts cleaning machine to prevent the risk of corrosion!

Install the cylinder head

Install

- new valve stem seals
- valves
- springs
- new filter for VVT solenoid. (Does not apply to S40 (04-)/V50).

Install the cylinder head. Use information in VIDA for the variant in question.

Rebuilding the engine

Note! Use new components.

Install:

- new oil suction line
- well cleaned or new oil sump
- new oil trap with new hoses and clamps
- new oil pressure switch
- new oil delivery line for turbocharger when applicable.

Engine oil, first change

Clean the [oil filter](#) casing and install the new oil filter.

Fill with new Synthetic Oil; this will assist in continuing the cleaning process. ACEA A1/B1, viscosity SAE 5W-30

Note: Engines subjected to extreme driving conditions are to be filled with ACEA A1/B3, viscosity SAE 5W-30 Synthetic oil.

"Extreme" regards driving conditions that generate abnormally high oil temperature or oil consumption, such as driving in mountains with a lot of engine braking or when driving at high speeds on highways.

ACEA A3/B3, viscosity SAE 5W-30 Synthetic oil.

Customer information



Affix the oil decal (part no.30748024) on the upper [radiator](#) member. Remove any existing decal.

Caution! Make sure that the customer is aware of the importance of following the prescribed oil change intervals and the benefits of using Synthetic oil to prevent engine oil deposits from reoccurring. Use the Synthetic oil grades specified in step 13.

Follow up oil and filter change

Drive 2,000 km/1,200 miles and then replace the oil and filter. Use one of the Synthetic oil grades specified at step 13.

Caution! Follow the recommended oil change interval that applies to the vehicle in question.