

Lubrication system components, removing and installing

WARNING!

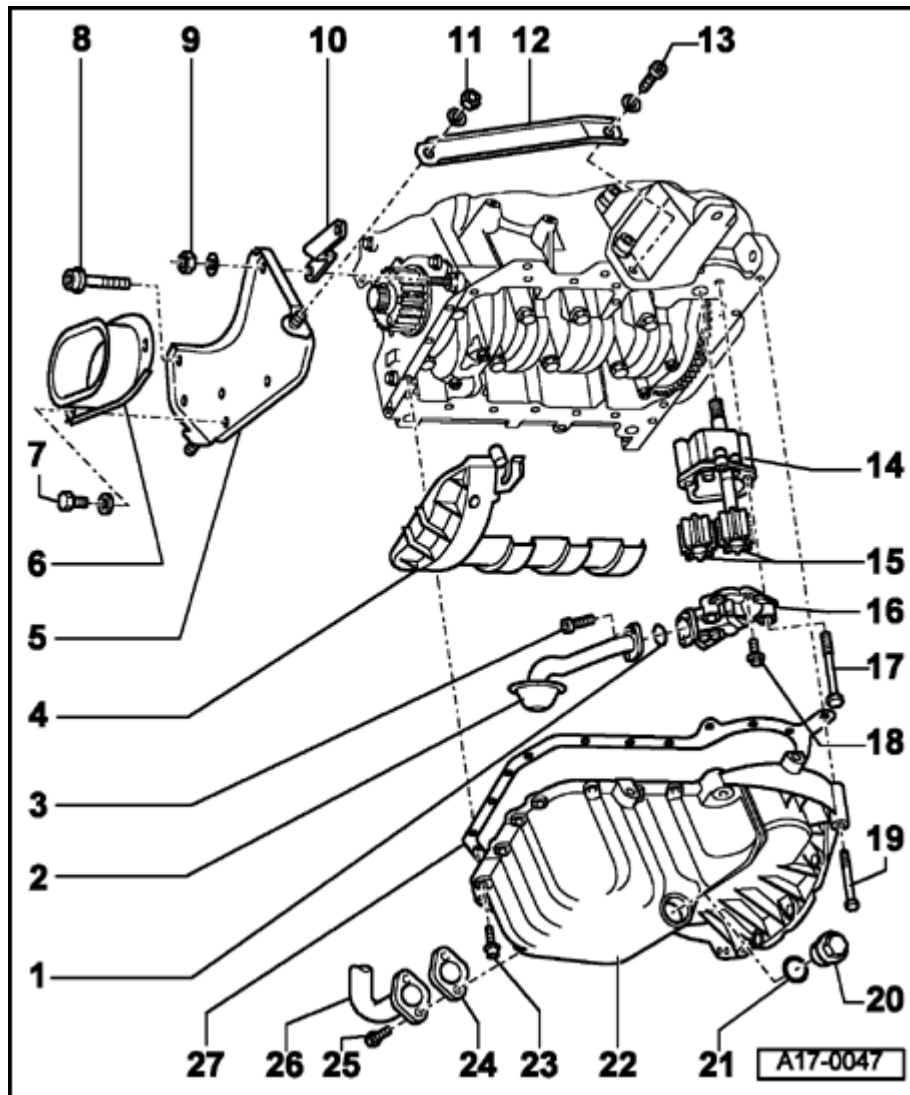
- ◆ *Do not re-use any fasteners that are worn or deformed in normal use.*
- ◆ *Some fasteners are designed to be used only once, and are unreliable and may fail if used a second time. This includes, but is not limited to, nuts, bolts, washers, circlips and cotter pins. Always follow the recommendations in this manual—replace these fasteners with new parts where indicated, and any other time it is deemed necessary by inspection.*

CAUTION!

- ◆ *If large quantities of metal particles or other deposits (caused, for example, by partial seizure of the crankshaft or connecting rod bearings) are found in the engine oil, the oil passages must be cleaned thoroughly and the oil cooler replaced in order to prevent further damage from re-occurring.*
- ◆ *Do not overfill with oil past the MAX mark on*

the oil dipstick. Damage to the Three Way Catalytic Converter (TWC) could result. Markings, refer to illustration ⇒ [Page 17-27](#) .

Viscosity classes and oil specifications ⇒ [Page 17-26](#) .



Part I

CAUTION!

Part numbers are listed here for reference only. Always check with your Parts department for the latest information.

1 - O-ring

- ◆ Always replace

2 - Suction pipe

- ◆ Clean strainer if dirty

3 - Bolt

- ◆ 10 Nm (7 ft lb)

4 - Baffle plate

5 - Bracket

- ◆ For torque support

6 - Stop

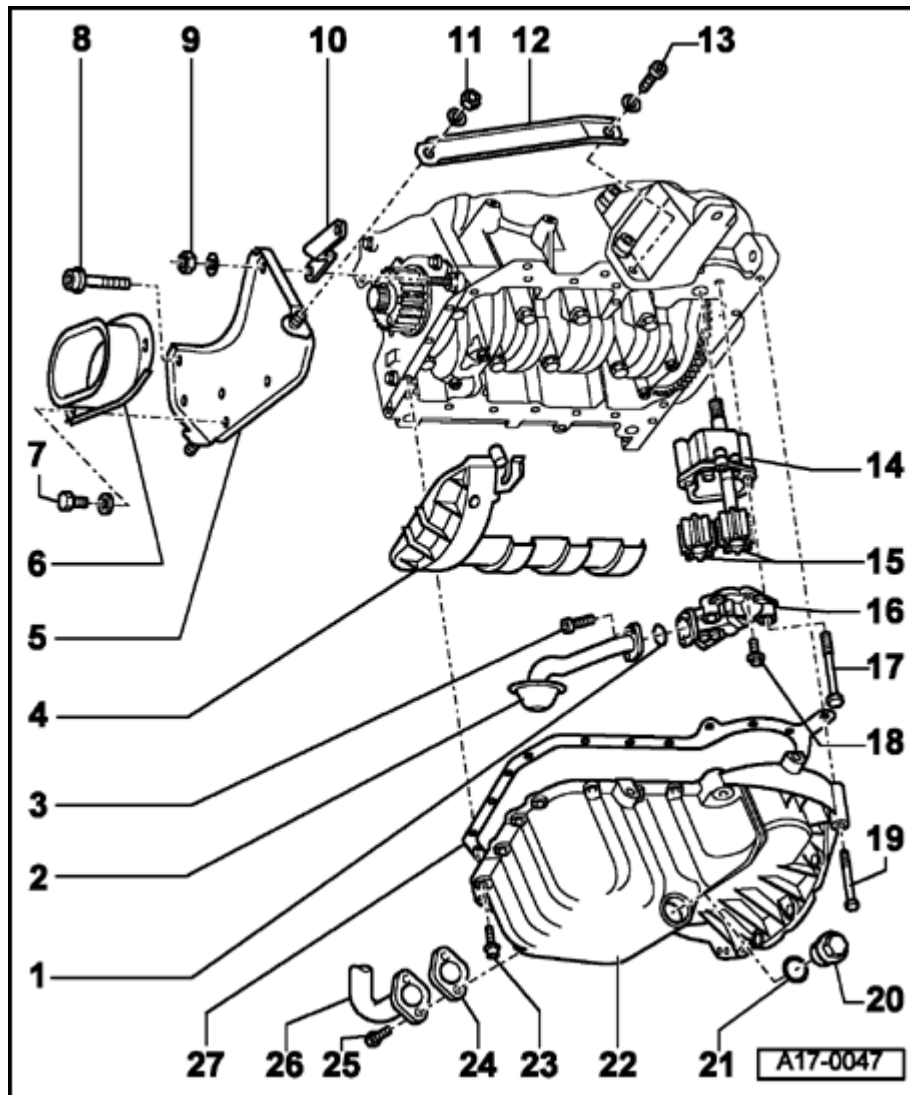
- ◆ For torque support

◆ Adjusting:

- Place stop for torque support on rubber buffer for torque support and tighten bolts to 25 Nm (18 ft lb)

7 - Bolt

◆ 25 Nm (18 ft lb)

**8 - Bolt**

◆ 25 Nm (18 ft lb)

9 - Nut

◆ 25 Nm (18 ft lb)

10 - Brace**11 - Nut**

◆ 25 Nm (18 ft lb)

12 - Side brace**13 - Bolt**

◆ 20 Nm (15 ft lb)

14 - Oil pump housing**15 - Gears**

◆ Backlash, checking ⇒ Fig. ⇒ [1](#)

◆ Axial clearance, checking ⇒ Fig. ⇒ [2](#)

16 - Oil pump cover with pressure relief valve

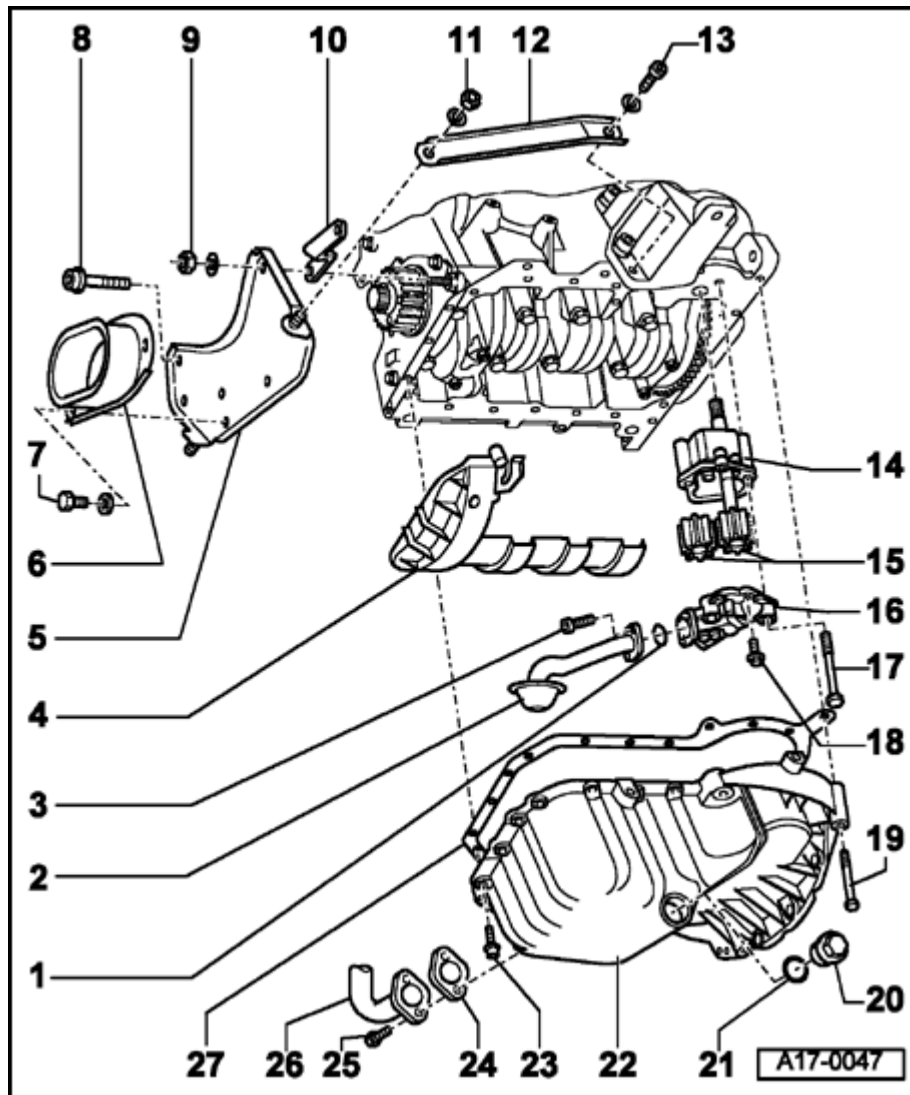
◆ Opening pressure: 5.7-6.7 bar (82.65-97.15 psi)

17 - Bolt

◆ 25 Nm (18 ft lb)

18 - Bolt

◆ 10 Nm (7 ft lb)

**19 - Bolt**

- ◆ 45 Nm (33 ft lb)

20 - Oil drain plug

- ◆ 50 Nm (37 ft lb)

21 - Sealing washer

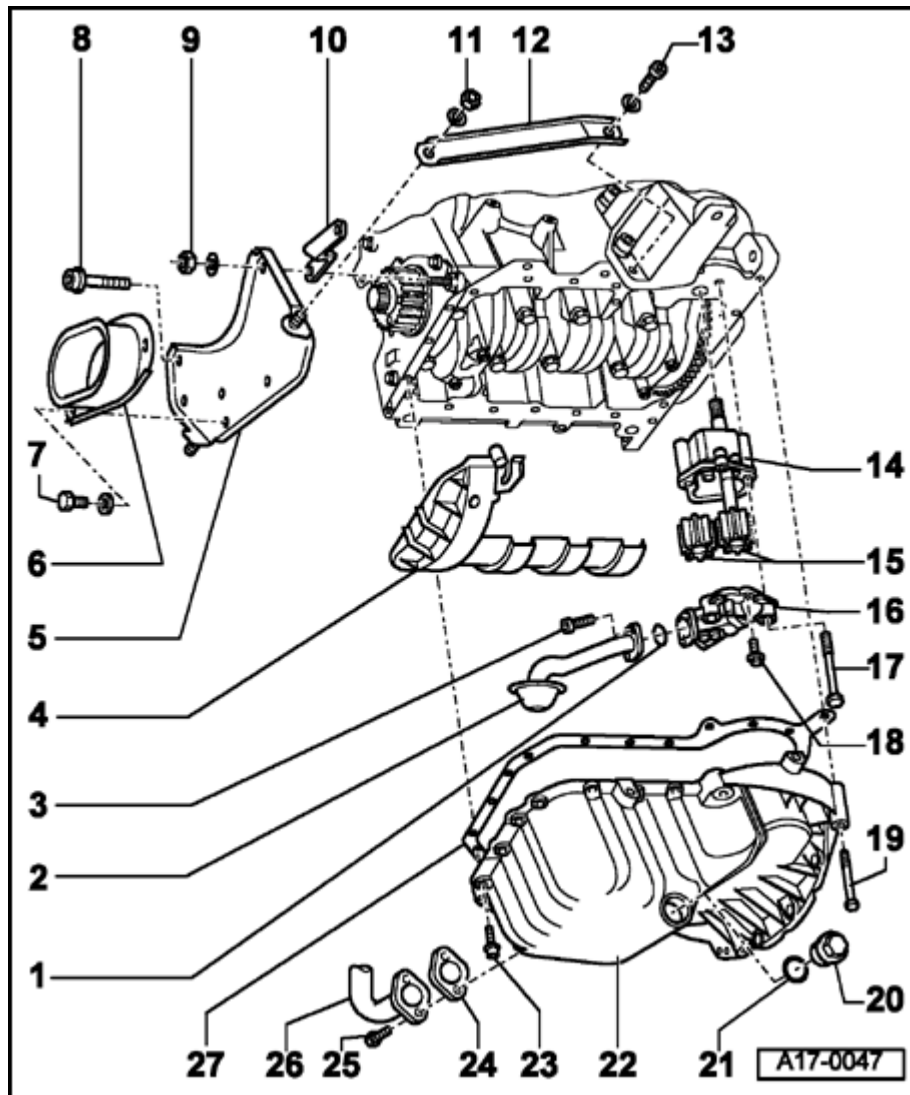
- ◆ Always replace

22 - Oil pan

- ◆ Removing and installing ⇒ [Page 17-9](#)
- ◆ Clean contact surface before installing
- ◆ When installing oil pan on removed engine, note that oil pan is aligned with metal plate on flywheel side (i.e. oil pan projects out over engine block 0.8 mm 0.031 in.)
- ◆ Before installing oil pan, spread thin coat of sealant AMV 174 004 01 on sealing surface between oil seal carrier and engine block

23 - Bolt

- ◆ 10 Nm (7 ft lb)
- ◆ Use 3249 hex ball socket to remove and install two rear bolts on transmission
- ◆ Tighten diagonally in sequence

**24 - Gasket**

- ◆ Always replace

25 - Bolt

- ◆ 10 Nm (7 ft lb)

26 - Oil return line

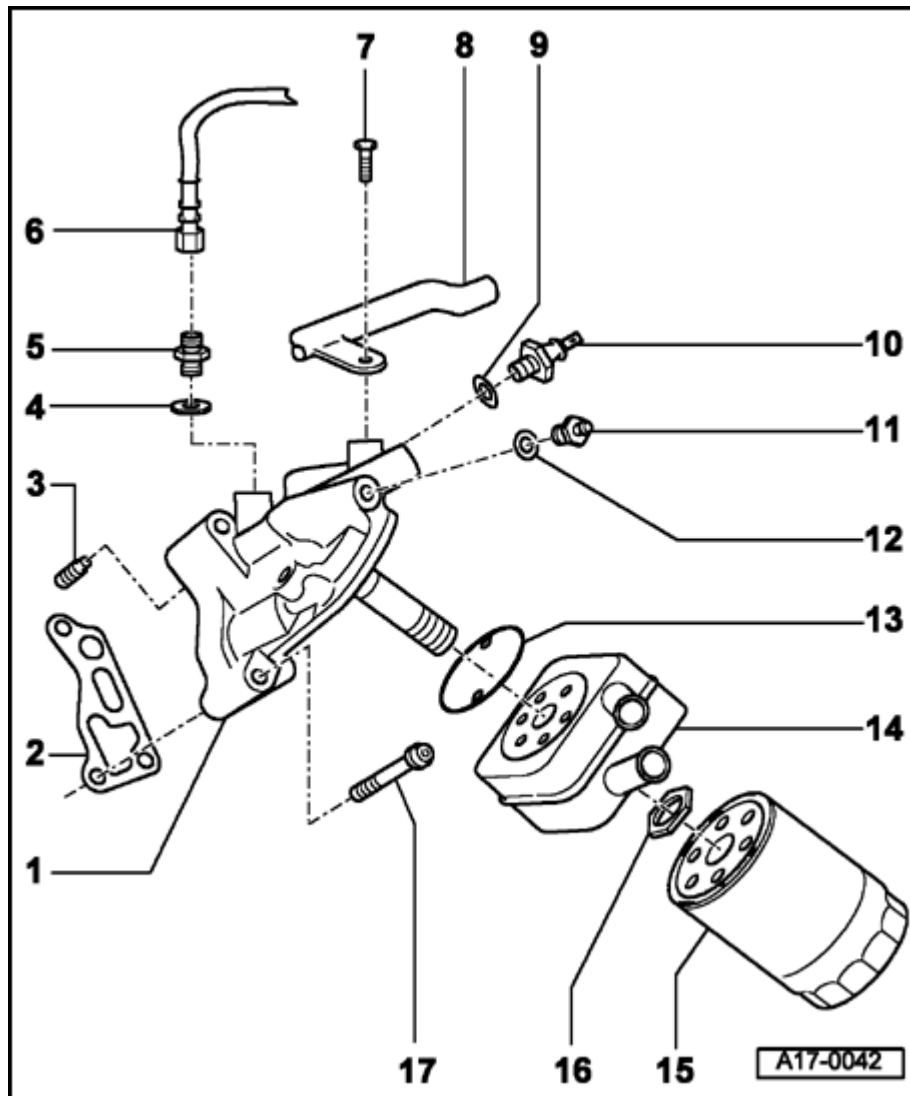
- ◆ From turbocharger

27 - Gasket

- ◆ Always replace
- ◆ Install dry
- ◆ Only spread thin coat of sealant AMV 174 004 01 on front and rear sealing surfaces between oil seal carrier and engine block

CAUTION!

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Part II

1 - Oil filter bracket

2 - Gasket

◆ Always replace

3 - Oil retaining valve

◆ 8 Nm (71 in. lb)

4 - Gasket

◆ Always replace

5 - Coupling

◆ 30 Nm (22 ft lb)

6 - Oil feed line

◆ 25 Nm (18 ft lb)

◆ To turbocharger

7 - Bolt

◆ 20 Nm (15 ft lb)

8 - Lower coolant pipe

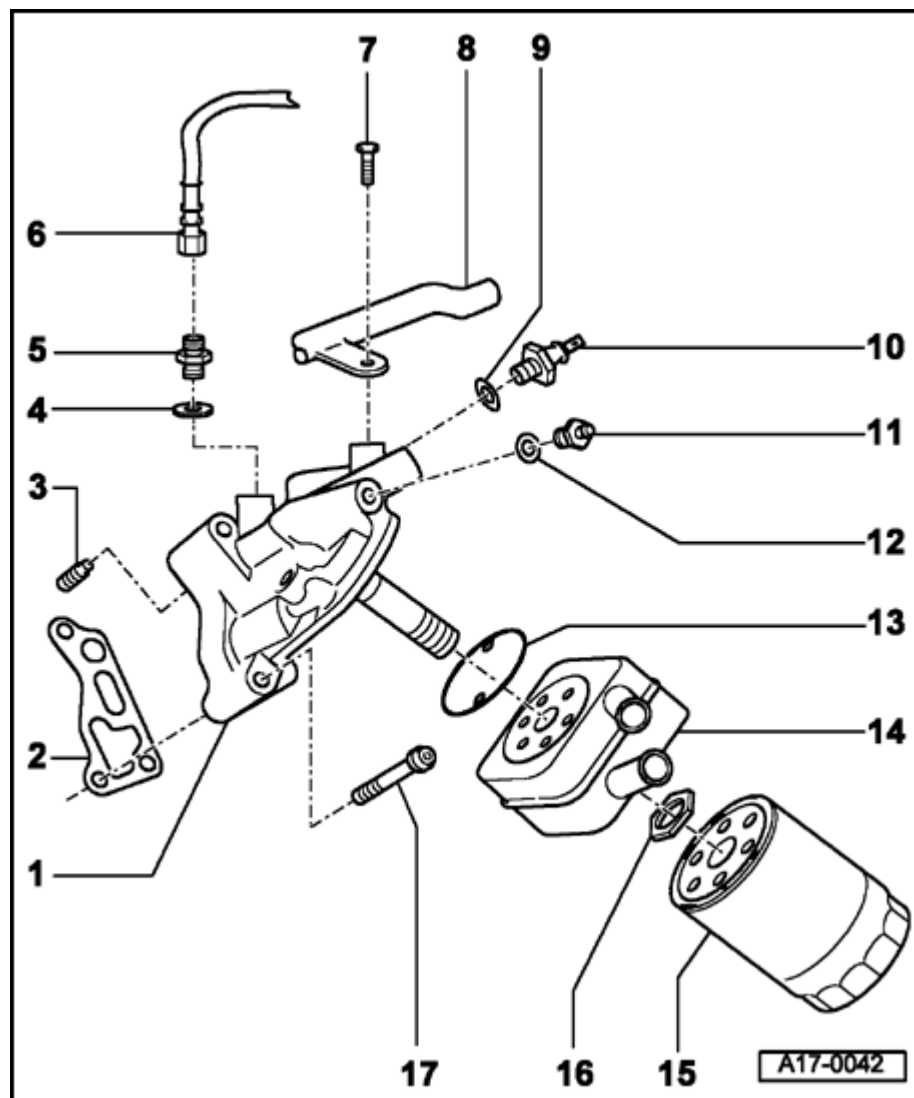
9 - Sealing washer

◆ If leaking, cut open and replace

10 - Oil pressure switch -F1-, 1.4 bar (20.3 psi)

◆ 25 Nm (18 ft lb)

- ◆ Black insulation
- ◆ Check ⇒ [Page 17-22](#)

**11 - Engine oil temperature sensor -G8-**

- ◆ 10 Nm (7 ft lb)

12 - Sealing washer

- ◆ If leaking, cut open and replace

13 - O-ring

- ◆ Always replace
- ◆ Snap into grooves on oil cooler

14 - Oil cooler

- ◆ Refer to "CAUTION!" ⇒ [Page 17-1](#)
- ◆ Coolant hose connection diagram ⇒ [Page 19-2](#)

15 - Oil filter

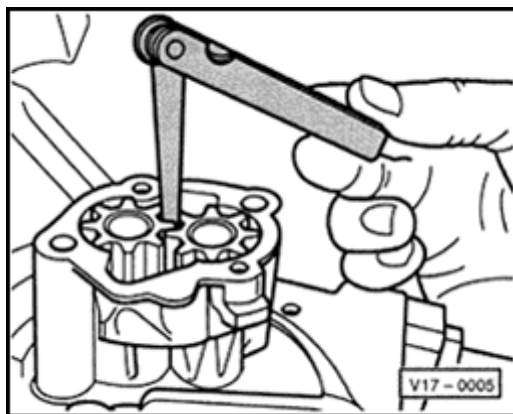
- ◆ Follow filter change intervals
- ◆ Use 3417 oil filter wrench to remove
- ◆ Follow installation notes found on oil filter
- ◆ Tightening torque: 20 Nm (15 ft lb)

16 - Nut

- ◆ 25 Nm (18 ft lb)

17 - Hex socket bolt

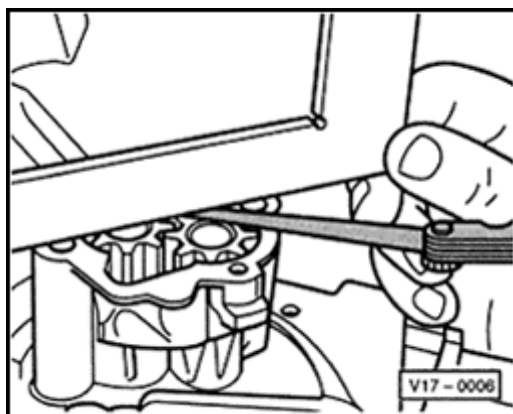
- ◆ 25 Nm (18 ft lb)



A

Fig. 1 Checking oil pump backlash

- ◆ New: 0.05 mm (0.002 in.)
- ◆ Wear limit: 0.20 mm (0.008 in.)



A

Fig. 2 Checking oil pump axial clearance

Wear limit: 0.15 mm (0.006 in.)

Oil pan, removing and installing

Special tools and equipment

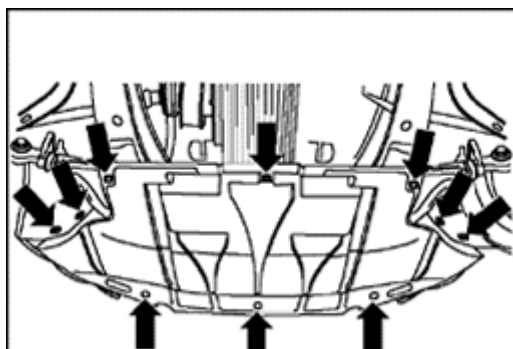
- ◆ 10-222A engine support bridge with 10-222A/1 bracket for engine
- ◆ 2024A engine sling
- ◆ 3249 puller
- ◆ VAG1202A engine hoist
- ◆ AMV 174 004 01 sealant

Note:

Always replace gaskets.

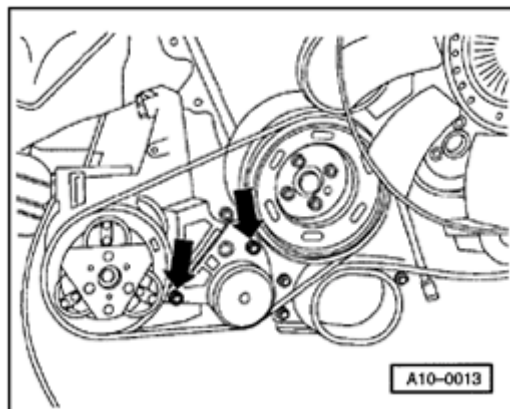
Removing

- Remove noise insulation panel (arrows).
- Drain engine oil.

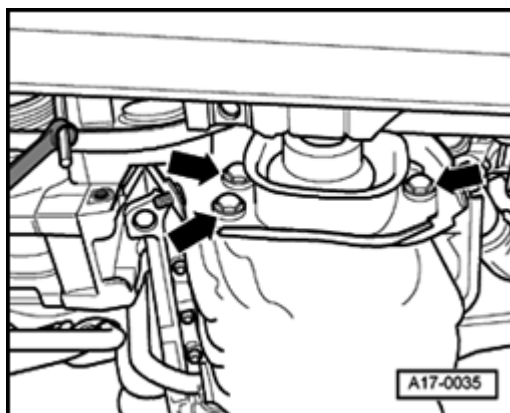


CAUTION!

**Before removing ribbed belt, note direction of rotation with chalk or felt-tip marker.
Reversing the direction of rotation of a used belt can destroy the belt.**

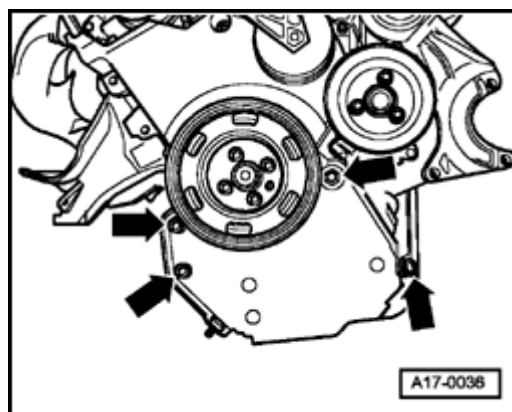
**A**

- Remove bolts for ribbed belt tensioner for A/C compressor (arrows).
- Release tension on ribbed belt and remove.
- Remove belt pulley.

**A**

- Remove torque support stop (arrows).

17-11

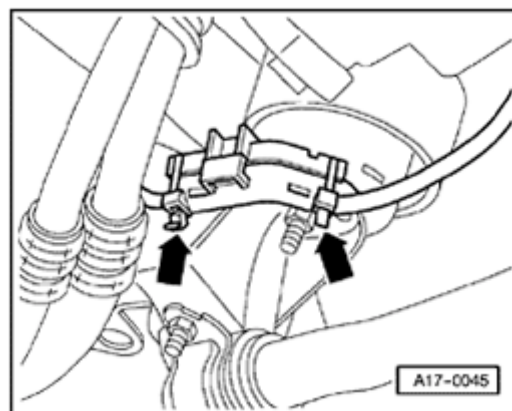


- Remove side brace from left side of torque support bracket.

A - Remove torque support bracket from engine (arrows).

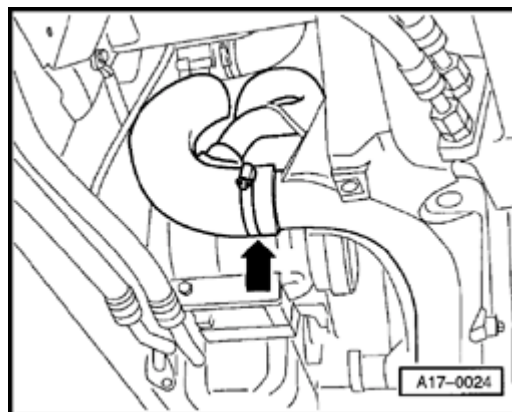
Note:

Illustration is shown with engine removed.

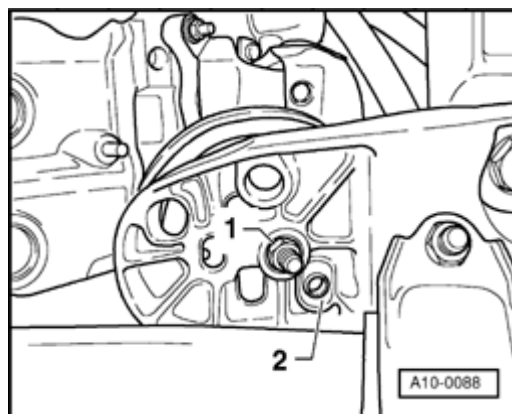


A - Cut tie wraps (arrows), open bracket for starter wiring and remove wiring.

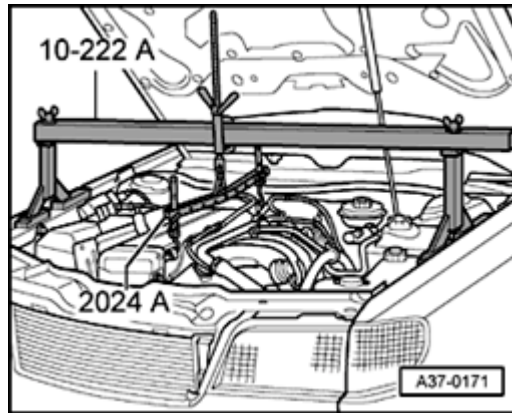
17-12



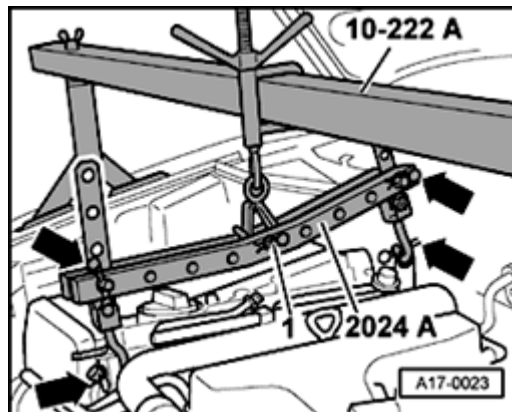
- A**
- Remove hose from turbocharger at air guide tube in lock carrier (arrow).



- A**
- Remove both nuts -1- from lower engine mount.



- Remove engine covers.
- A** - Set 10-222A engine support bridge on fender mounting edges.



- A** - Remove mounting eye from 2024A engine sling.
- Insert bolt -1- in center bore of 2024A engine sling and secure using cotter pin.
- Attach 2024A engine sling bolt to 10-222A engine support bridge spindle.
- Attach 2024A engine sling to mounting eyes at front and rear of engine.

WARNING!

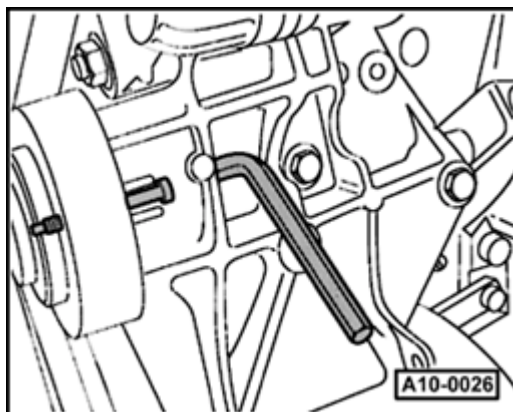
Mounting hooks and pins on the engine sling must be secured with the positioning lock (arrows).

- Using 10-222A engine support bridge spindle, lift up engine as far as possible.

Note:

Lift engine only as far as possible without overstretching or damaging any pipes or coolant hoses. Check for clearance of viscous fan; if necessary remove.

- Release tension on ribbed belt ⇒ [Page 13-15](#).



A

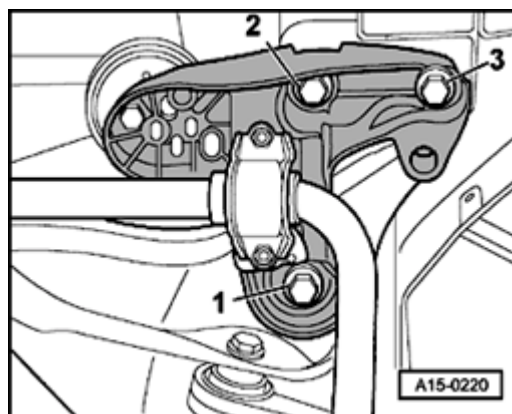
- Secure belt pulley for viscous fan using M5 x 60 mm bolt and unbolt using 8mm hex socket wrench.
- Remove viscous fan and place forward in fan frame.



A

- Use VAG1202A engine hoist to support subframe.

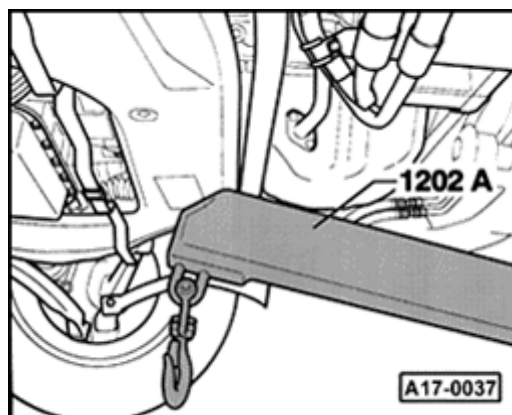
17-15



- A** - First remove front bolts -2- and -3- from subframe, then remove bolt -1-

Note:

Only loosen or lower subframe at front to avoid changing wheel alignment.

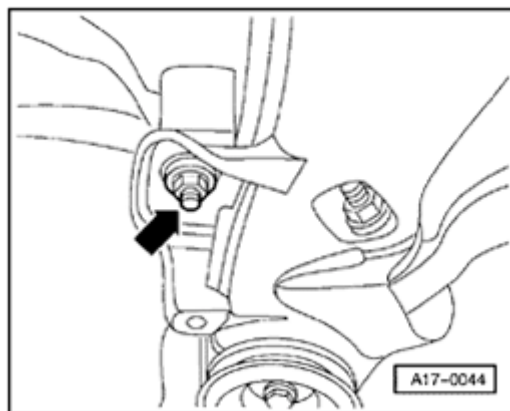


- A** - Using VAG1202A engine hoist slowly lower subframe.
- Pull out VAG1202A engine hoist and swing stabilizer down.

Vehicles with manual transmission

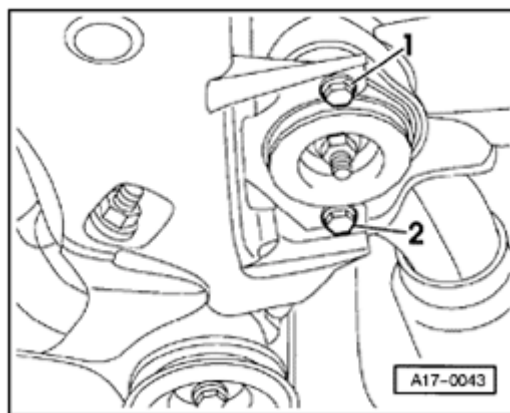
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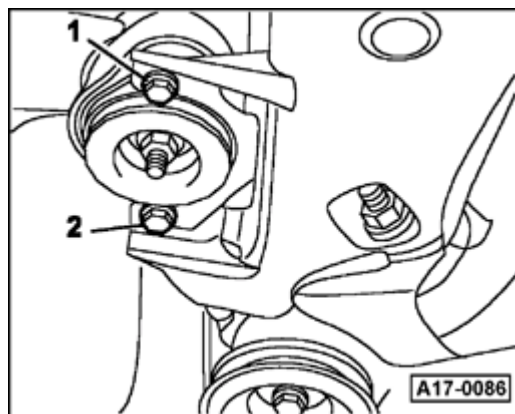
- Loosen left transmission mount nut (arrow) until it is aligned with lower edge of bolt (approx. 4 turns).

**Vehicles with automatic transmission**

A

- Loosen rear bolt -2- for left transmission mount several turns. Remove front bolt -1- for left transmission mount.

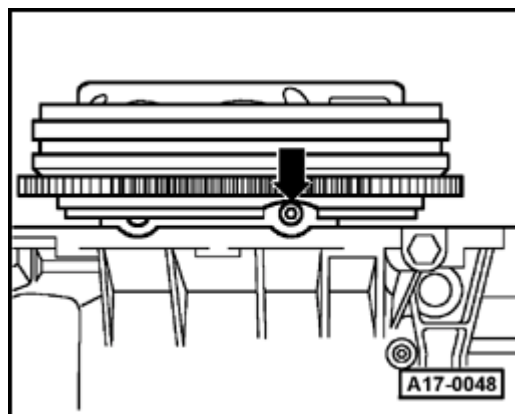




All models

- A**
- Loosen rear bolt -2- for right transmission mount several turns. Remove front bolt -1- for right transmission mount.
 - Remove oil return line for turbocharger at oil pan.
 - Unbolt oil pan.

Note:



- A**
- ◆ *For vehicles with manual transmission: both rear bolts on oil pan can be reached through opening on flywheel (arrow). Turn flywheel as needed.*
 - ◆ *Use 3249 hex ball socket to remove rear oil pan bolts.*
 - Remove oil pan (if necessary tap lightly using rubber hammer to remove).

Installing

Installation is the reverse of removal, noting the following:

Note:

- ◆ *Replace gaskets and O-rings.*

- ◆ *When installing oil pan on removed engine, note that oil pan is aligned with metal plate on flywheel side (i.e. oil pan projects out over engine block 0.8 mm, or 0.0315 in.).*

- Clean sealing surfaces before installing oil pan.

- Lightly spread AMV 174 004 01 sealant on front and rear contact surfaces of oil seal carrier.

- Tighten bolts between oil pan and engine block in 2 stages and diagonal sequence.

- Install oil pan and tighten all bolts between oil pan and engine block to 5 Nm (44 in. lb) (stage 1).

- Tighten bolts between oil pan and transmission.

Tightening torque: 45 Nm (33 ft lb)

- Tighten M10 bolts between oil pan and engine block.

Tightening torque: 45 Nm (33 ft lb)

- Tighten all M6 bolts between oil pan and engine block to 10 Nm (7 ft lb) (stage 2).

- Install subframe ⇒ Repair Manual, Suspension, Wheels, Steering, Repair Group 40.
- Place torque support on rubber buffer for torque support and tighten bolts to 25 Nm (18 ft lb).
- Install ribbed belt ⇒ [Page 13-15](#) .

Note:

When installing ribbed belt, check for correct seating on belt pulley.

- Add engine oil and check oil level.

CAUTION!

Do not overfill with oil past the MAX mark on the oil dipstick. Damage to the Three Way Catalytic Converter (TWC) could result.

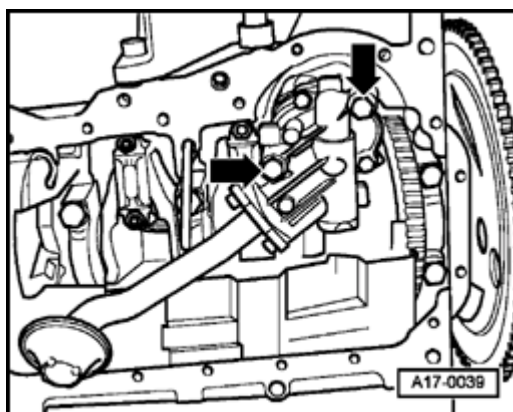
Tightening torques

Component	Tightening torques
Oil pan to engine block	M6 10 Nm (7 ft lb)
	M10 45 Nm (33 ft lb)
Oil pan to transmission	45 Nm (33 ft lb)
Engine mount to subframe	25 Nm (18 ft lb)
Torque support to bracket on engine	25 Nm (18 ft lb)
Torque support bracket to engine	25 Nm (18 ft lb)
Side brace to bracket for torque support	25 Nm (18 ft lb)
Side brace to engine support	20 Nm (15 ft lb)
Oil drain plug	50 Nm (37 ft lb)
Oil return line to oil pan	10 Nm (7 ft lb)
Transmission mount to subframe	23 Nm (17 ft lb)

Oil pump, removing and installing

Removing

- Remove oil pan ⇒ [Page 17-9](#) .
- Unhinge baffle plate and remove.



A

- Remove bolts (arrows).
- Press down on subframe and remove oil pump.

Installing

Installation is the reverse of removal, noting the following:

Installing oil pan ⇒ [Page 17-18](#) .

Tightening torque

Component	Tightening torques
Oil pump to engine block	25 Nm (18 ft lb)

Oil pressure and oil pressure switch, checking

Function of dynamic oil pressure warning system

Warning lamp, checking

With engine switched off and ignition on (terminal 15 on), oil pressure warning lamp will be lit (not for vehicles with Auto Check system).

Warning criteria

- Engine switched off and oil pressure switch closed.
- Coolant temperature less than 60 ° C (140 ° F), engine speed higher than 300 RPM and oil pressure switch open.
- Coolant temperature greater than 60 ° C (140 ° F).
- At engine speeds greater than 5000 RPM, an active oil warning won't be erased independent of oil pressure switch setting.
- A Diagnostic Trouble Code (DTC) is recognized when oil pressure switch is open

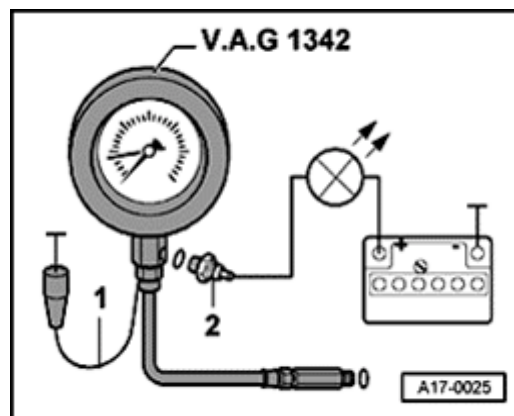
for more than 0.5 seconds at engine speeds greater than 1500 RPM. If condition occurs more than three times during a drive, warning will remain active even at engine speeds less than 1300 RPM.

Special tools and equipment

- ◆ VAG1342 oil pressure tester
- ◆ VAG1527B voltage tester
- ◆ VAG1594A measuring appliance adapter

Test conditions

- Oil level OK
- Oil pressure warning light -K3- must light up when ignition is switched on.
- For vehicles with Auto Check system, "i.O" indicator must be lit (call up symbol)
- Engine oil temperature approximately 80 ° C (176 ° F)



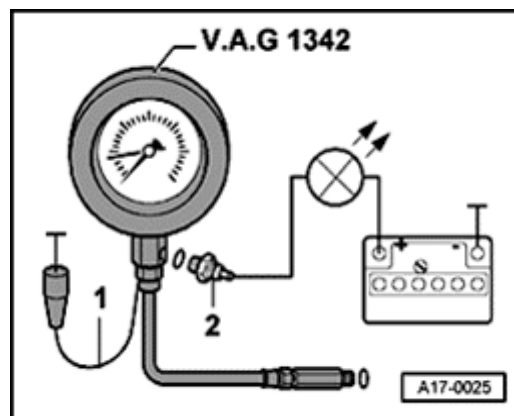
Oil pressure switch, checking

- Disconnect line from oil pressure switch.
 - Remove oil pressure switch and install VAG1342 oil pressure tester.
 - Install oil pressure switch into VAG1342 oil pressure tester.
 - Connect brown wire -1- of tester to Ground (GND).
 - Using VAG1594 adapter, connect VAG1527B voltage tester to oil pressure switch and Battery Positive Voltage (B+).
- LED must not be lit.
- If LED is lit, replace oil pressure switch.
 - Start engine.

Note:

While starting engine, watch pressure tester and LED as oil pressure switch may open during start.

- At 1.2-1.6 bar (17.4-23.2 psi) LED must be lit.
- If LED does not light, replace oil pressure switch.



Oil pressure, checking

- Disconnect line from oil pressure switch.
- A
- Remove oil pressure switch and install VAG1342 oil pressure tester.
- Install oil pressure switch into VAG1342 oil pressure tester.
- Start engine.
 - Engine oil temperature approximately 80 ° C (176 ° F).
 - ◆ Oil pressure at idle: 1.0-3.5 bar (14.5-50.75 psi)
 - ◆ Oil pressure at 3000 RPM: 5.0-7.0 bar (72.5-101.5 psi)

If specified values are not obtained, the pressure relief valve or the oil pump is faulty.

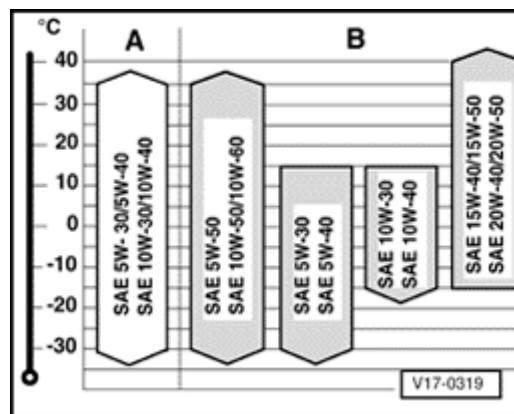
- Replace oil pump ⇒ [Page 17-21](#) .

Engine oil

Engine oil capacity (w/filter): 3.5 L (3.7 qt.).

The engine is factory-filled with a high quality multi-grade oil that can be used as an all-season oil, except in extremely cold climates.

Viscosity classes and oil specifications



A

Select the viscosity according to the chart shown. The oil does not need to be changed if the outside temperature only briefly exceeds the specified ranges.

The specifications stated on these pages must be indicated on the container either individually or in combination with other specifications.

A - Multi-grade oil, specification VW 500 00¹⁾

B - Multi-grade oil, specification VW 501 01¹⁾

- Multi-grade oil, specification API-SF- or -SG-²⁾

¹⁾ This VW specification must have a date of 10/91 or later.

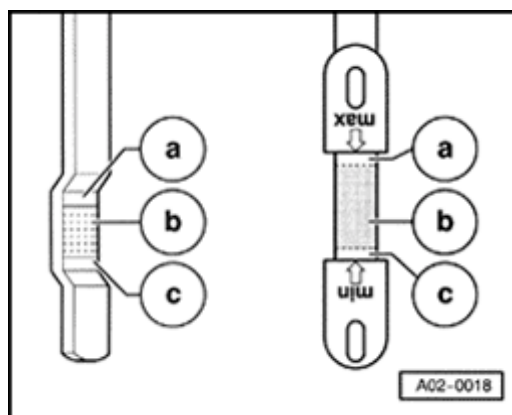
²⁾ These oils may only be used in exceptional cases if no approved engine oil is available.

Mixing oils when topping up is permissible.

Oil level, checking

Test conditions

- Minimum engine oil temperature: 60 ° C (140 ° F)
 - Vehicle on level ground
 - After stopping engine, wait a few minutes to allow oil to flow back into oil pan
- Withdraw dipstick, wipe off using clean cloth and reinsert fully.
- Withdraw dipstick again and read oil level.



Range of markings on dipstick:

- a - Oil **MUST NOT** be topped off.
- b - Oil may be topped off. After topping off, oil may reach range -a-.
- c - Oil **MUST BE** topped off. After topping off, it is sufficient if oil level is somewhere in range -b- (shaded area).

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Do not overfill with oil past the MAX mark on the oil dipstick. Damage to the Three Way Catalytic Converter (TWC) could result.