

Cylinder head, removing and replacing

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.*

Notes:

- ◆ *The cylinder head can be removed and installed without removing the engine from the vehicle.*
- ◆ *When replacing the cylinder head, the engine coolant must be completely replaced.*
- ◆ *Checking compression ⇒ [Page 15-12](#) .*

- ◆ *When installing a replacement cylinder head complete with camshaft, the contact surfaces between the hydraulic valve lifters and the cam lobes must be lubricated after installing the cylinder head.*
- ◆ *The plastic liners supplied on replacement cylinder heads for protection of open valves must not be removed until just before installing the cylinder head.*

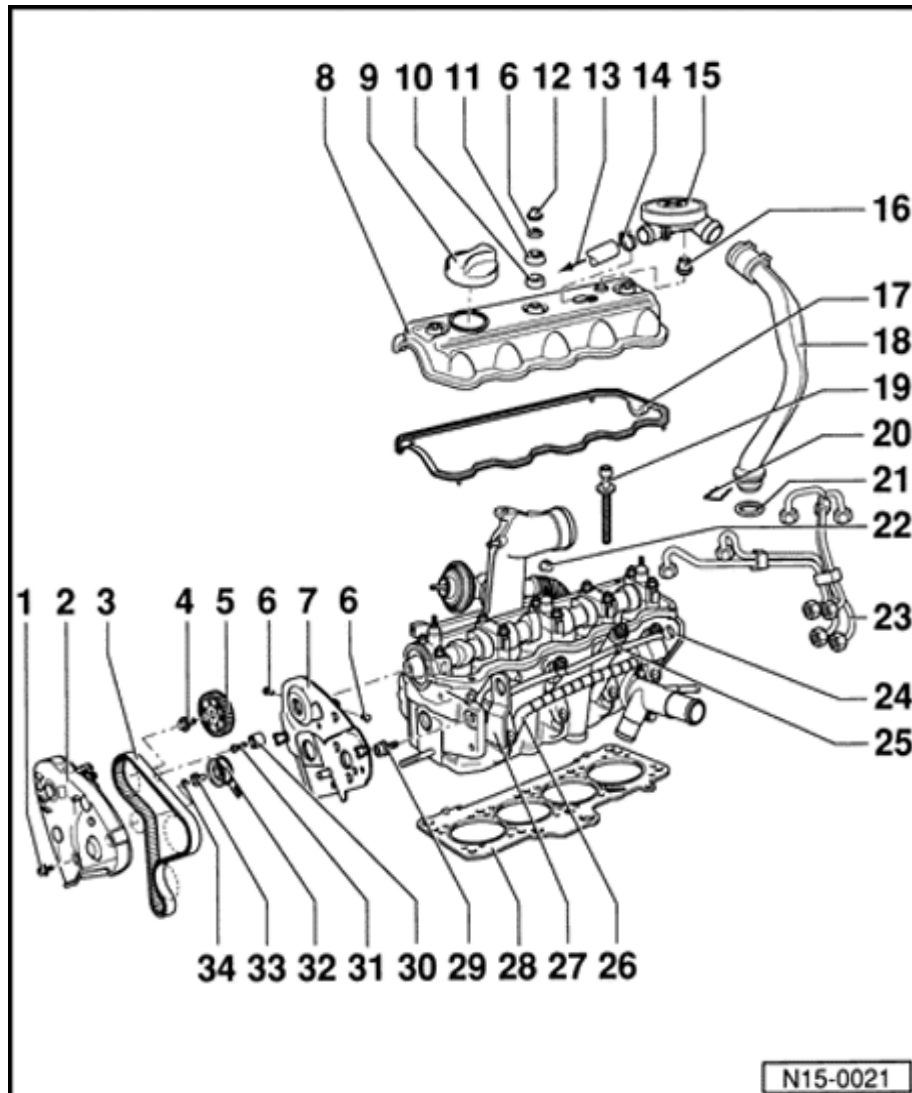


Metal cylinder head gasket

- ◆ From 11.93 ➤ all 1.9 liter Diesel engines are equipped with a new metal cylinder head gasket with silicone coating.
- ◆ When making repairs it is no longer necessary to tighten the cylinder head bolts by an additional 1/4-turn (90°) with the engine warm.
- ◆ The four-step procedure for tightening the cylinder head bolts during assembly has not changed.
- ◆ When installing a new metal cylinder head gasket, follow all precautions ⇒ Notes ⇒ [Page 15-9](#).

Note:

The new metal cylinder head gasket can be installed on all 1.9 liter Diesel engines manufactured before 11.93.



Cylinder head, disassembling and assembling

1 - Expanding clip

2 - Toothed belt guard, upper

3 - Toothed belt

◆ Mark running direction before removing

◆ Check for wear

◆ Do not kink

Removing and installing:

◆ Engine code 1Z ⇒ [Page 13-18](#)

◆ Engine code AHU ⇒ [Page 13-24](#)

4 - 45 Nm (33 ft lb)

5 - Camshaft sprocket

◆ Drive off camshaft taper using hammer and drift through toothed belt guard opening

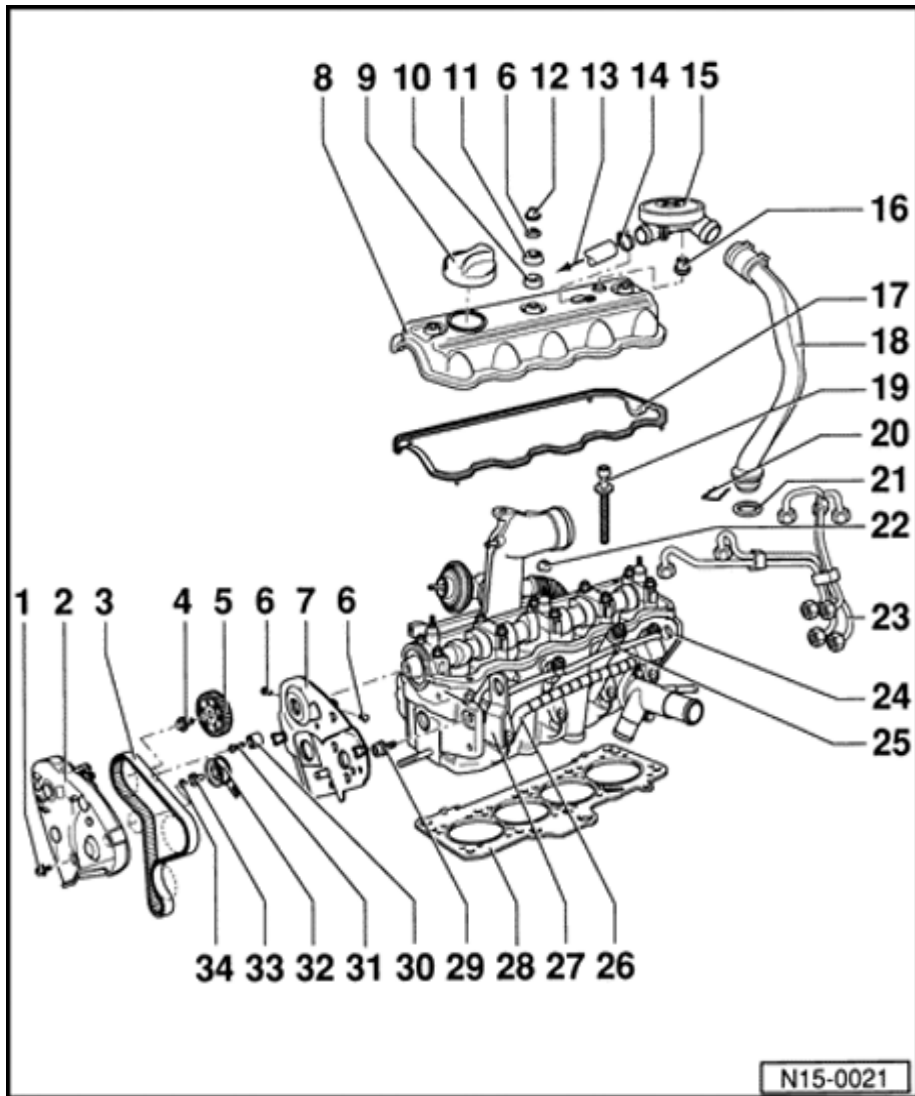
6 - 10 Nm (7 ft lb)

7 - Toothed belt guard, rear

8 - Cylinder head cover

9 - Cap

◆ Replace seal if damaged



10 - Upper sealing washer

- ◆ Replace if damaged

11 - Cup washer

12 - Cap

13 - To intake hose

14 - Retaining clip

15 - Positive Crankcase Ventilation (PCV) valve

- ◆ For crankcase breather

16 - Gasket

- ◆ Replace if damaged

17 - Cylinder head cover gasket

- ◆ Replace if damaged

- ◆ Insert projections into holes on cylinder head

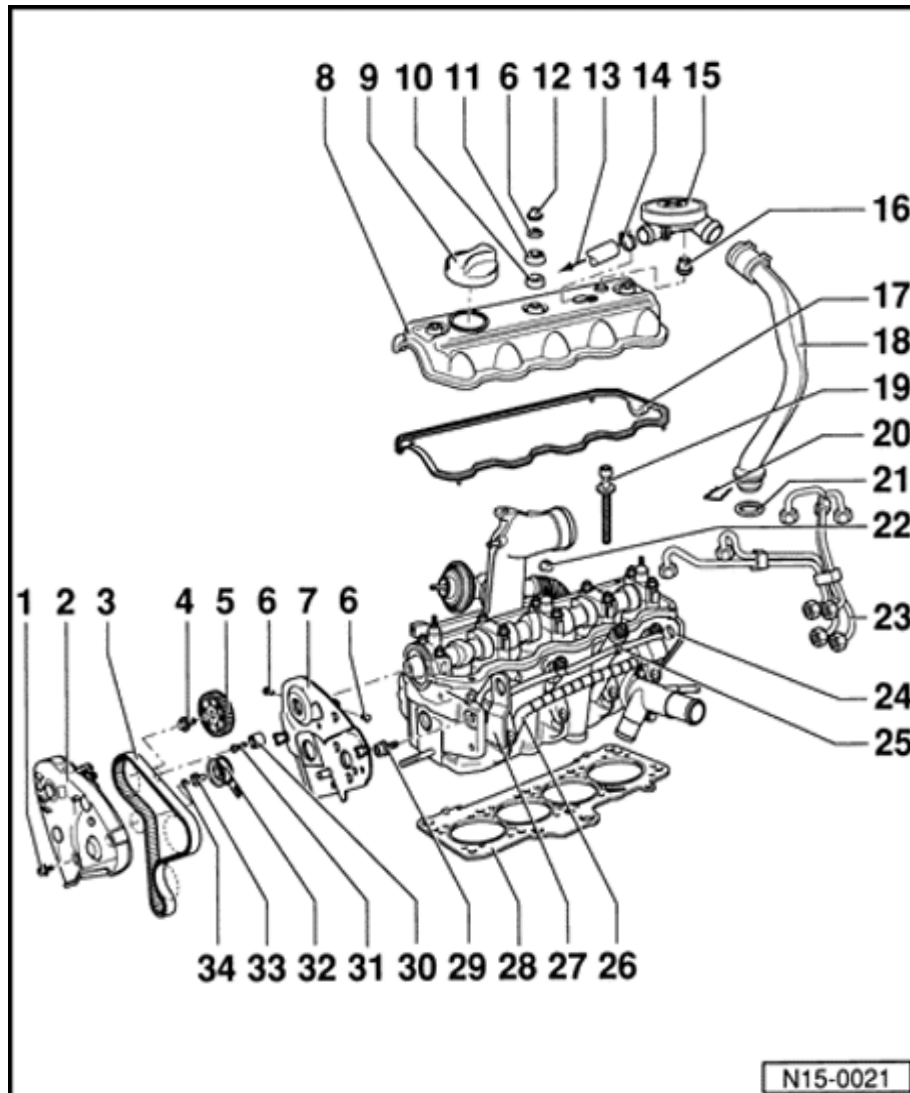
18 - Crankcase breather

19 - Cylinder head bolt

- ◆ Always replace

- ◆ Follow instructions for loosening and tightening in proper sequence ⇒ [Page 15-9](#)

20 - Mounting clip



21 - O-ring

- ◆ Always replace

22 - Lower sealing cone

23 - Injector lines

- ◆ 25 Nm (18 ft lb)
- ◆ Remove using 3035 injector line wrench
- ◆ Always remove fuel lines as an assembly
- ◆ Do not bend or alter shape

24 - Cylinder head

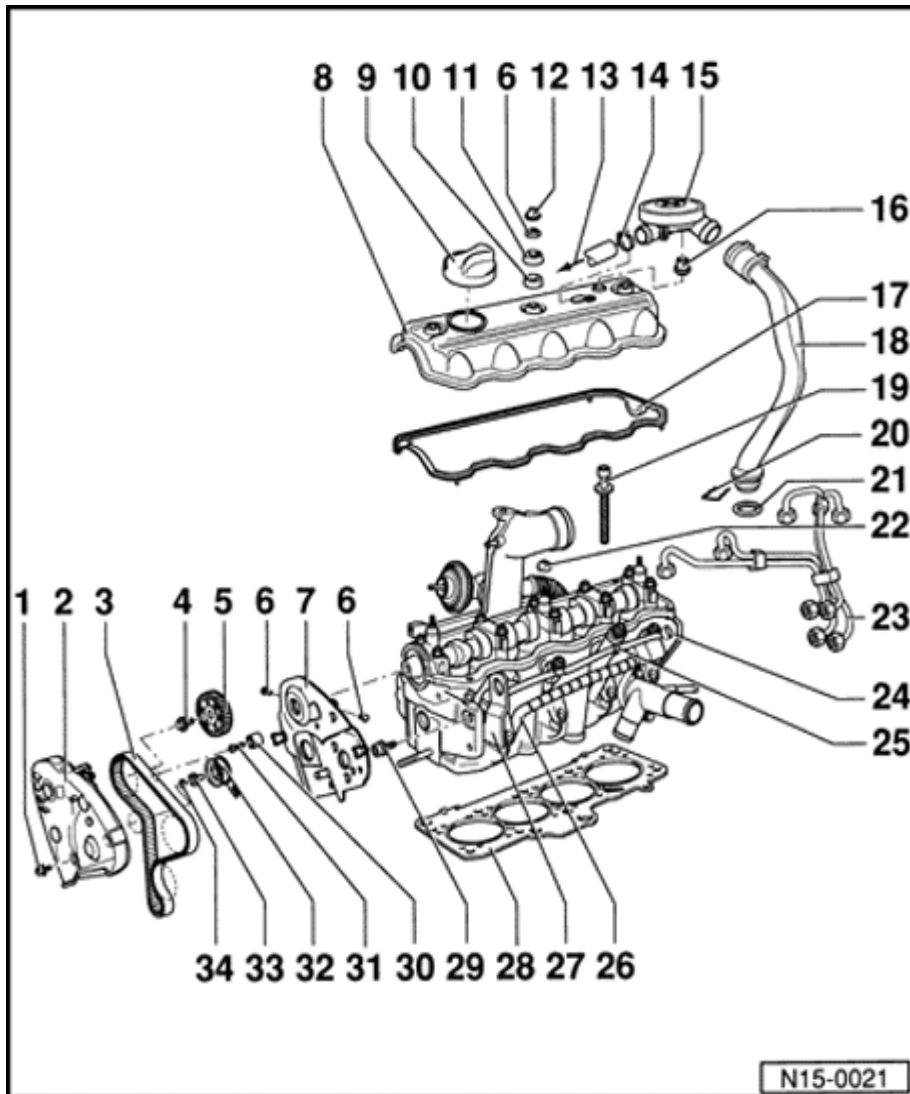
- ◆ Check for distortion ⇒ Fig. ⇒ [1](#)
- ◆ Installing ⇒ [Page 15-9](#)
- ◆ After replacing, engine coolant must be completely replaced

25 - Fuel injector

Removing and installing:

- ◆ Engine code AAZ ⇒ [Repair Manual, 1.9 Liter 4-Cyl. 2V Eco-Diesel Fuel Injection & Glow Plug, Engine Code\(s\): AAZ, Repair Group 23](#)
- ◆ Engine codes 1Z, AHU ⇒ [Repair Manual, 1.9 Liter 4-Cyl. 2V TDI Fuel Injection &](#)

Glow Plug, Engine Code(s): 1Z, AHU,
Repair Group 23



26 - Glow plug

Engine code AAZ:

- ◆ Tightening torque: 25 Nm (18 ft lb)
- ◆ Checking ⇒ [Repair Manual, 1.9 Liter 4-Cyl. 2V Eco-Diesel Fuel Injection & Glow Plug, Engine Code\(s\): AAZ, Repair Group 28](#)

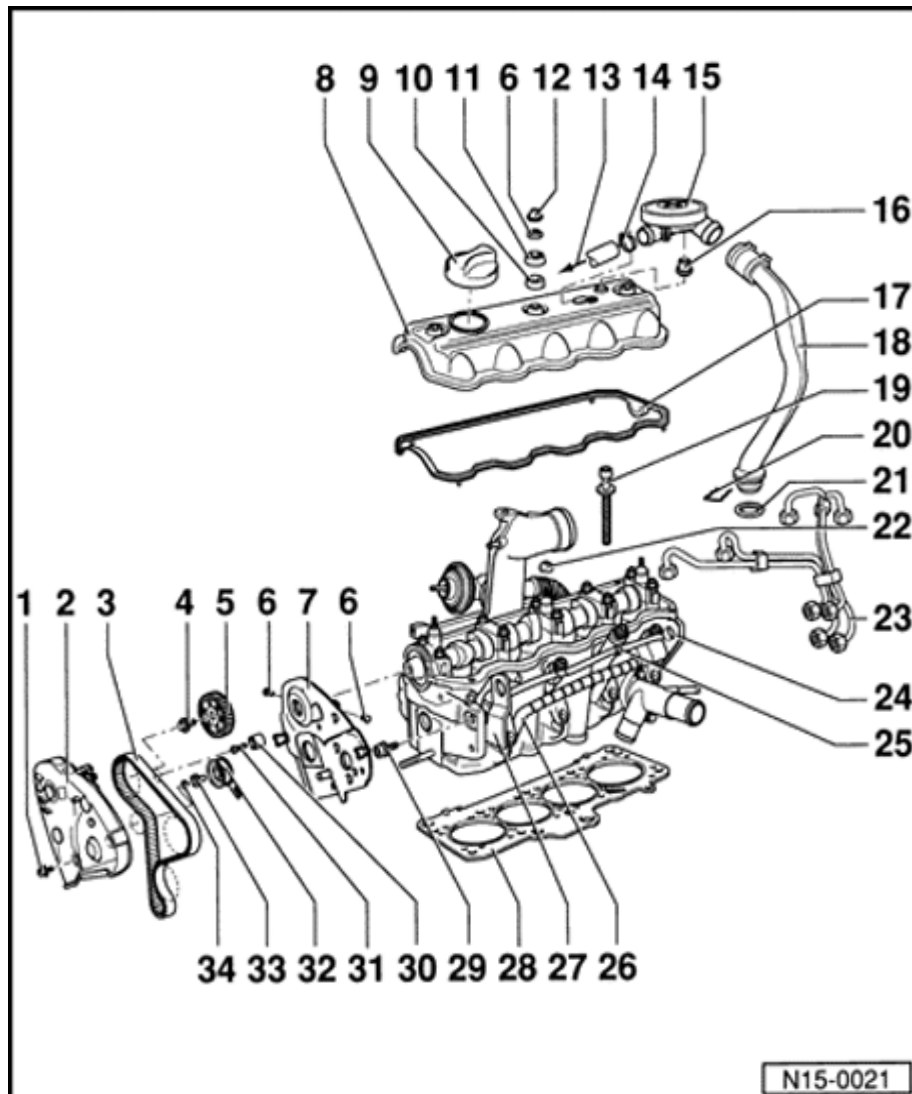
Engine codes 1Z, AHU:

- ◆ Tightening torque: 15 Nm (11 ft lb)
- ◆ Checking ⇒ [Repair Manual, 1.9 Liter 4-Cyl. 2V TDI Fuel Injection & Glow Plug, Engine Code\(s\): 1Z, AHU, Repair Group 28](#)

27 - Lifting eye

28 - Cylinder head gasket

- ◆ Always replace
- ◆ New metal gasket from 11.93 ⇒ [Page 15-2](#)
- ◆ Note marking ⇒ Fig. ⇒ [2](#)
- ◆ After replacing, engine coolant must be completely replaced



29 - 20 Nm (15 ft lb)

30 - Idler roller

- ◆ Engine codes 1Z, AHU

31 - 25 Nm (18 ft lb)

32 - Semi-automatic toothed belt tensioning roller

- ◆ Engine codes 1Z, AHU: checking ⇒ [Page 13-29](#)

33 - Eccentric

- ◆ Engine codes 1Z, AHU
- ◆ For semi-automatic toothed belt tensioning roller

34 - Tightening torque

- ◆ Engine code AAZ: 45 Nm (33 ft lb)
- ◆ Engine codes 1Z, AHU: 20 Nm (15 ft lb)

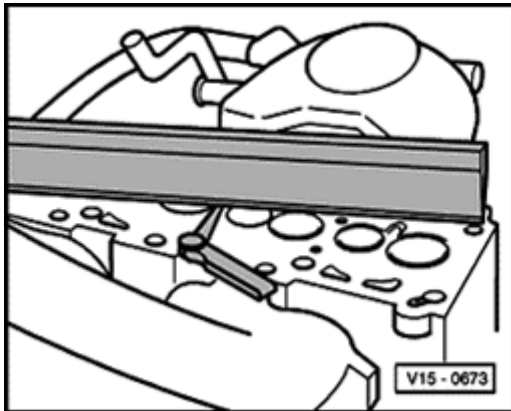


Fig. 1 Checking cylinder head distortion

Maximum permissible distortion: 0.1 mm (0.0039 in.)

CAUTION!

Resurfacing Diesel engine cylinder heads is not permissible.

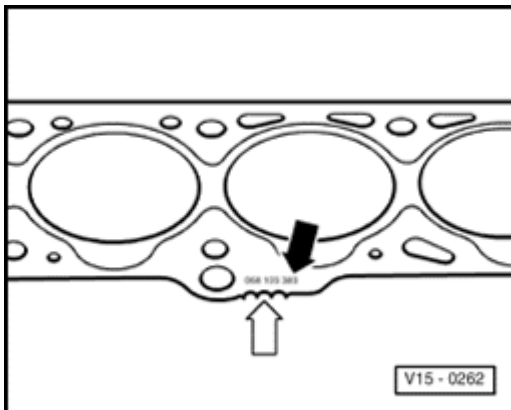


Fig. 2 Cylinder head gasket identification

- ◆ Part number (black arrow)
- ◆ Holes/notches (white arrow)

Different thickness cylinder head gaskets are available. The correct thickness depends on the amount of piston protrusion.

Measuring piston protrusion ⇒ [Page 13-49](#) .

When only replacing the cylinder head gasket, install a new gasket with the same identification.

Note:

New metal gasket, 11.93 ⇒ [Page 15-2](#) .



Cylinder head, installing

Special tools, testers and auxiliary items

- ◆ VAG1332 torque wrench 40 to 200 Nm
- ◆ 3070 guide pins

CAUTION!

Always replace cylinder head bolts.

Notes:

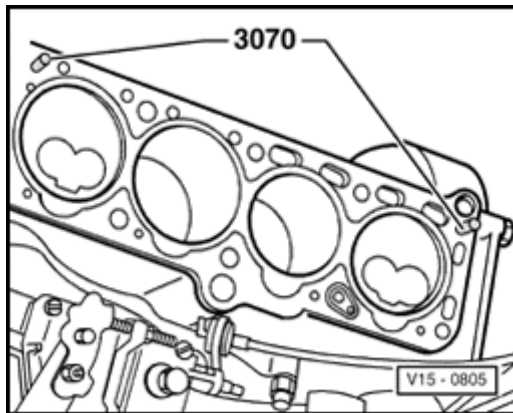
- ◆ *During repairs, carefully remove seal/gasket fragments from cylinder head and cylinder block. Make sure that no longitudinal grooves or scratches are created. When using abrasive paper do not use a grade coarser than 100. Carefully remove any abrasive debris.*
- ◆ *Remove new cylinder head gasket from packaging, just before installing.*
- ◆ *Handle gasket extremely carefully. Damaging the silicone layer or the indented area can cause leakage.*

- ◆ *New metal cylinder head gaskets can be installed on 1.9 liter Diesel engines manufactured before 11.93 ⇒ [Page 15-2](#) .*

- Turn crankshaft to TDC mark before installing cylinder head.

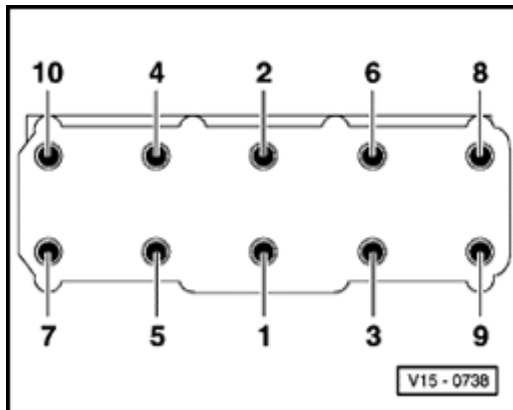
- Turn crankshaft against engine direction of rotation until all pistons are approximately equally placed below TDC.

- Install cylinder head gasket.



A

- To center gasket, screw guide pins from 3070 into outer threaded holes on intake side.
- Install cylinder head, thread in 8 remaining cylinder head bolts and tighten by hand.
- Remove guide pins using removal tool from 3070 and install cylinder head bolts.



A

- Tighten cylinder head bolts in four stage sequence as shown. (Loosen in reverse order):
 1. Tighten initially using a torque wrench.
 - ◆ Stage I: 40 Nm (30 ft lb)
 - ◆ Stage II: 60 Nm (44 ft lb)
 2. Turn further using a hand wrench.
 - ◆ Stage III: additional 1/4-turn (90°)
 - ◆ Stage IV: additional 1/4-turn (90°)

Note:

It is NOT necessary to re-torque cylinder head bolts after the first 1,000 km (600 mi).



Installation with older style head gasket ONLY

- Tighten according to above four stage sequence.

- After final assembly, run engine until completely warm-oil temperature at least 50 ° C (122 ° F)- and tighten bolts additional 1/4-turn (90 °).
 - ◆ Do not loosen bolts first

 - ◆ Follow tightening sequence

 - ◆ Tighten each bolt in one step, without interruption

 - ◆ It is NOT necessary to re-torque cylinder head bolts after the first 1,000 km (600 mi).

All vehicles

- After tightening cylinder head, rotate camshaft so cam for no. 1 cyl. points evenly upward.

- Rotate crankshaft, in running direction of engine

to TDC before installing toothed belt.