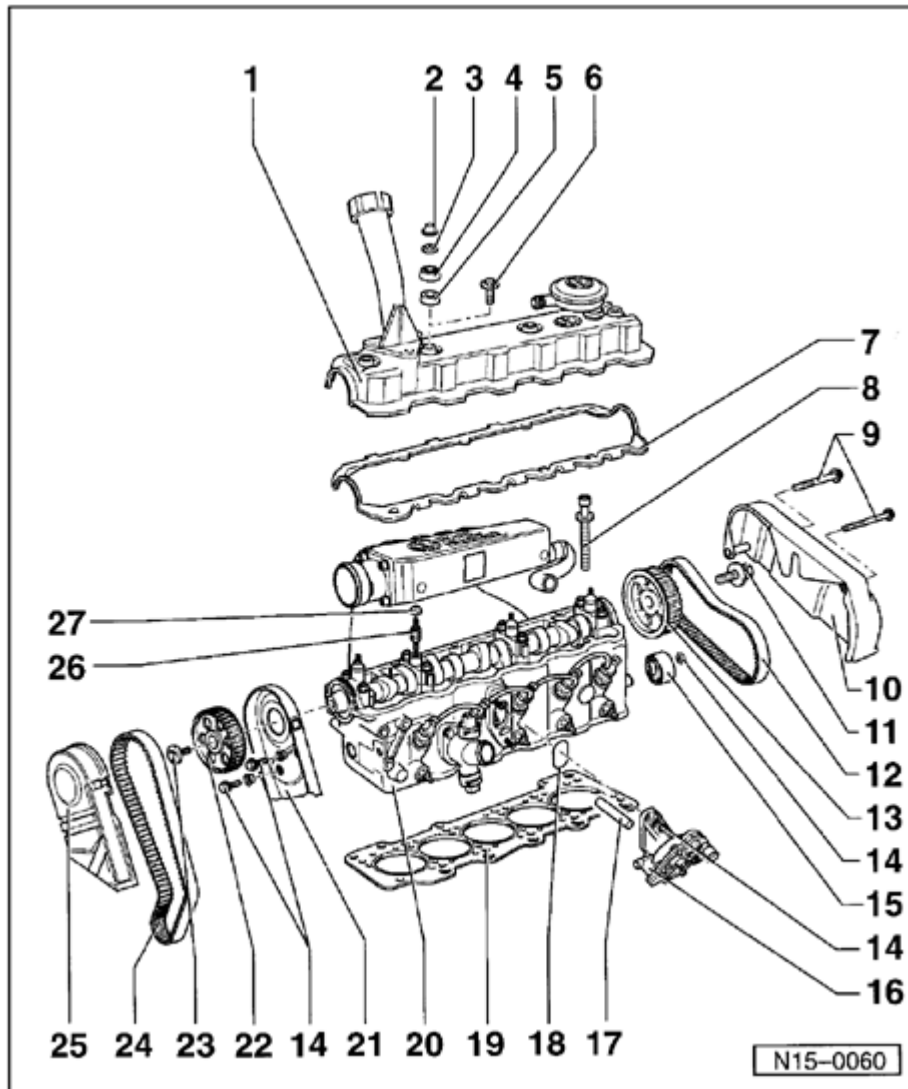


Cylinder head, removing and installing

Checking compression pressures ⇒ [Page 15-14](#)

Note:

- ◆ *When installing an exchange cylinder head with installed camshaft, the contact surfaces between valve lifter and cam must be oiled after installation.*
- ◆ *The plastic protectors installed to protect the open valves must only be removed immediately before installing the cylinder head.*
- ◆ *When replacing the cylinder head the complete coolant must be replaced.*



1 - Cylinder head cover

- ◆ Engine code: AAB
- ◆ For engine code ACV the cylinder head cover is secured to bearing cap with hex bolts

2 - Cover cap

- ◆ Engine code: AAB

3 - 10 Nm

- ◆ Engine code: AAB

4 - Dished washer

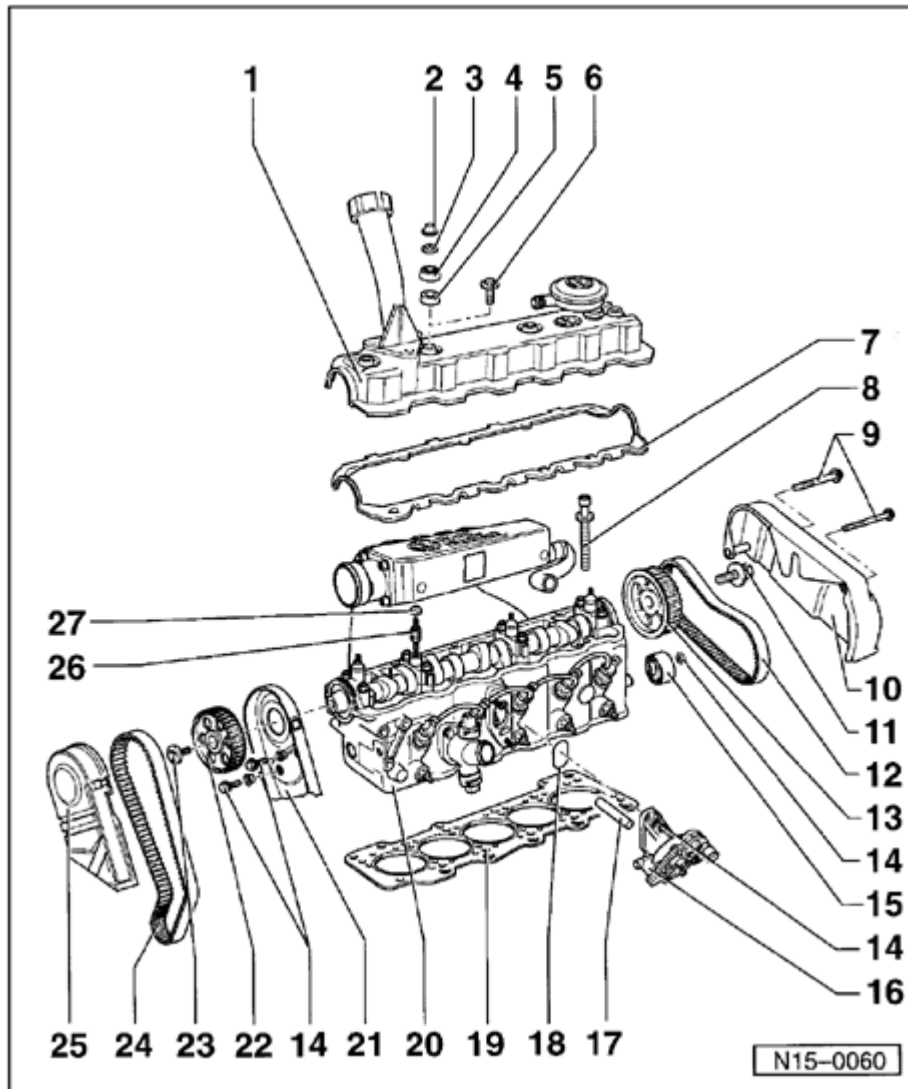
- ◆ Engine code: AAB

5 - Upper sealing washer

- ◆ Engine code: AAB
- ◆ Replace if damaged

6 - 10 Nm

- ◆ Engine code ACV



7 - Cylinder head cover gasket

- ◆ Replace if damaged
- ◆ Insert into groove on cylinder head cover

8 - Cylinder head bolt

- ◆ Replace
- ◆ Note sequence when loosening and tightening ⇒ [Page 15-10](#) , Installing cylinder head

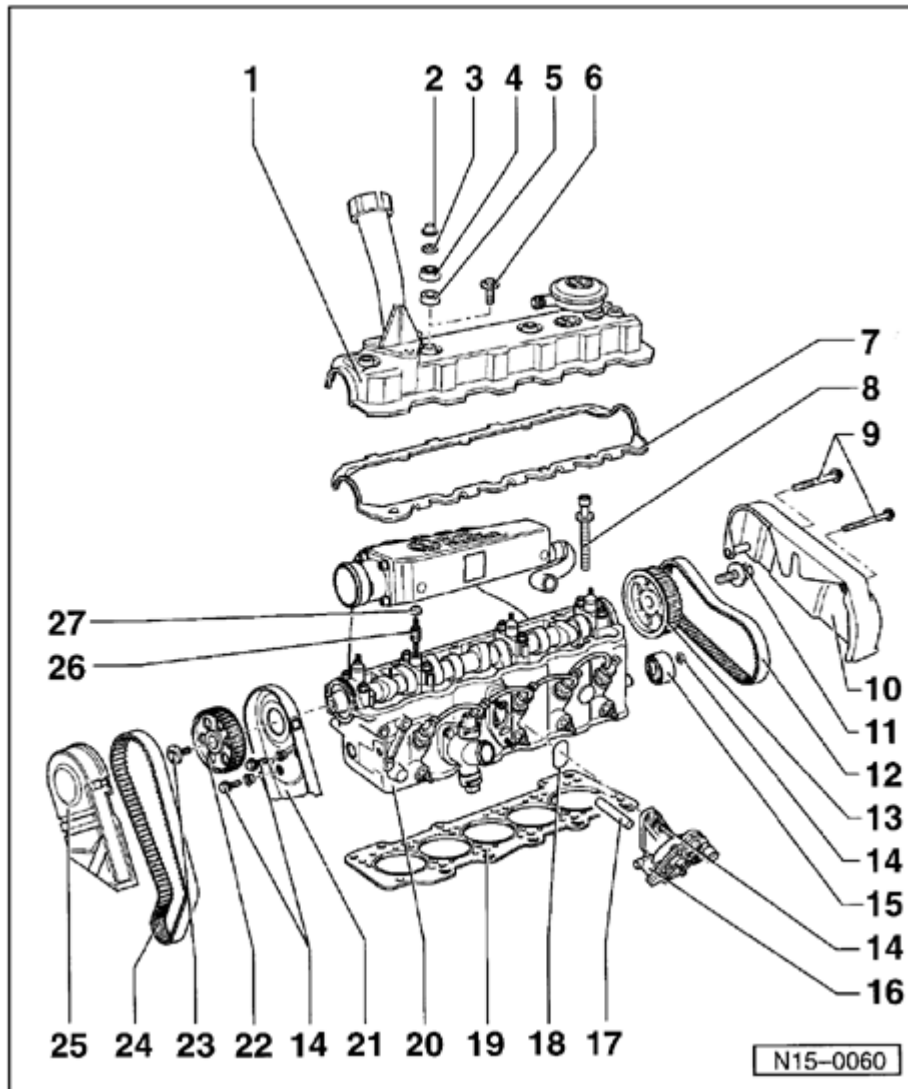
9 - Toothed belt guard securing bolt

- ◆ M6 = 10 Nm
- ◆ M8 = 20 Nm

10 - Toothed belt guard

11 - Injection pump drive sprocket securing bolt

- ◆ Engine code AAB: 100 Nm
- ◆ Engine code ACV: 160 Nm
- ◆ Oil threads and contact surface
- ◆ Use counter-hold 3036 to loosen and tighten

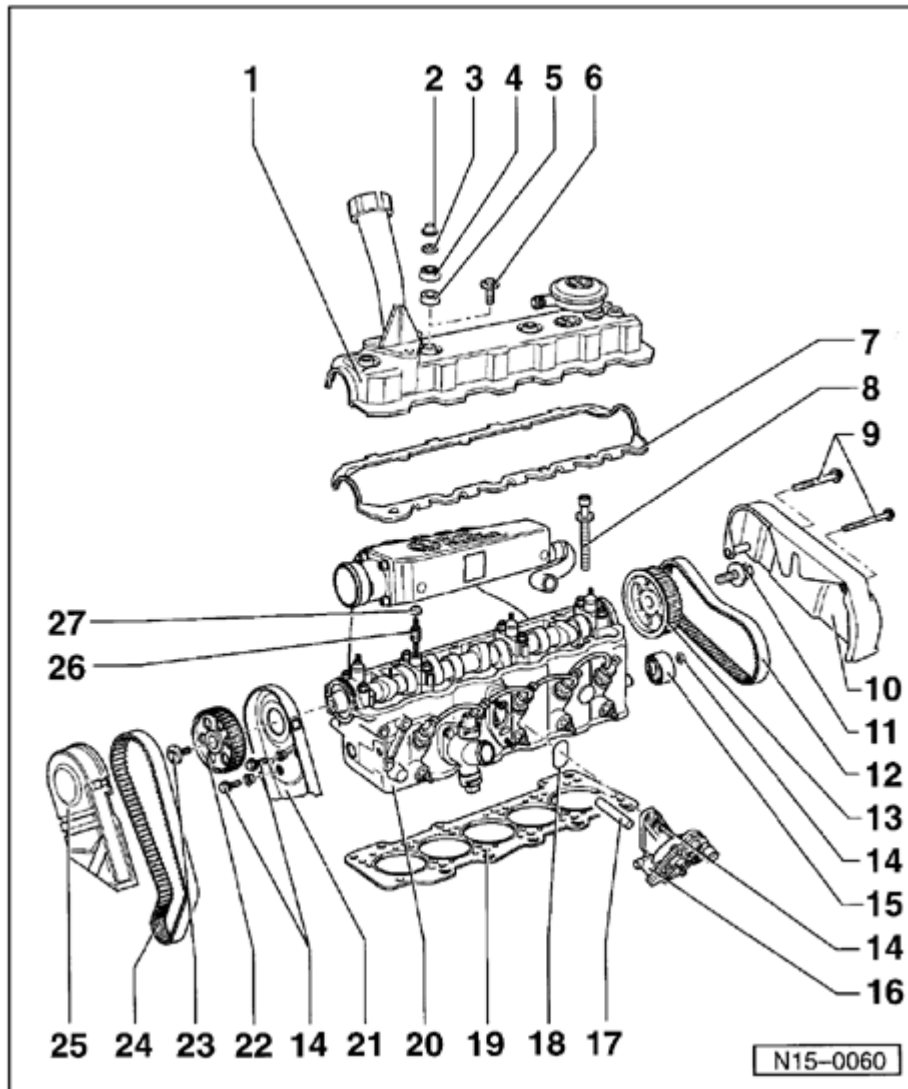


12 - Injection pump toothed belt

- ◆ Mark direction of rotation before removing
- ◆ Check for wear
- ◆ Do not kink
- ◆ Removing, installing and tightening: Engine code AAB ⇒ [Page 13-54](#) Engine code ACV ⇒ [Page 13-61](#)

13 - Injection pump drive sprocket

- ◆ Note position when installing toothed belt:
Engine code AAB ⇒ [Page 13-54](#) ,
Removing, installing and tightening injection pump toothed belt;
- Engine code ACV ⇒ [Page 13-61](#) ,
Removing, installing and tightening injection pump toothed belt



14 - 20 Nm

15 - Idler roller

- ◆ Engine code ACV
- ◆ Note installation position ⇒ [Page 13-61](#) ,
Removing, installing and tightening
injection pump toothed belt

16 - Vacuum pump

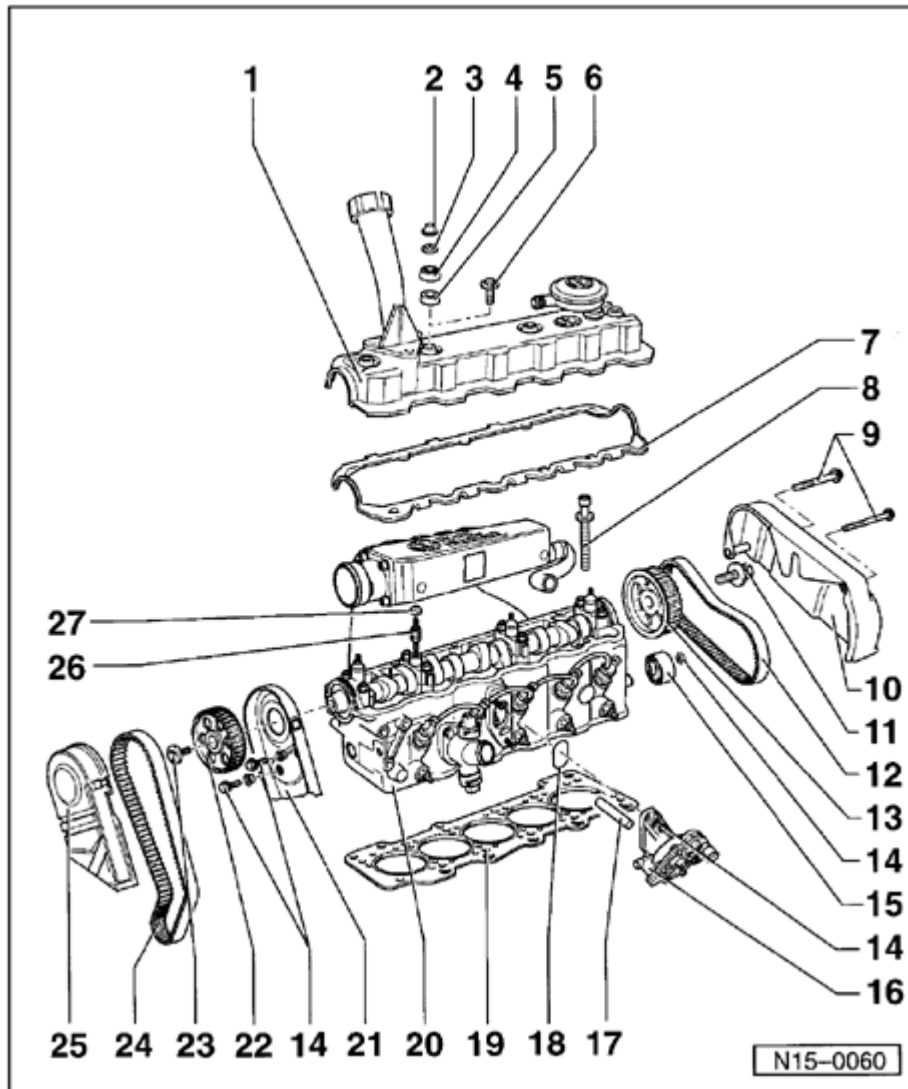
17 - Plunger

18 - O-Ring

- ◆ Always replace

19 - Cylinder head gasket

- ◆ Always replace
- ◆ Note marking ⇒ [Fig. 2](#)
- ◆ If replaced, replace the complete coolant



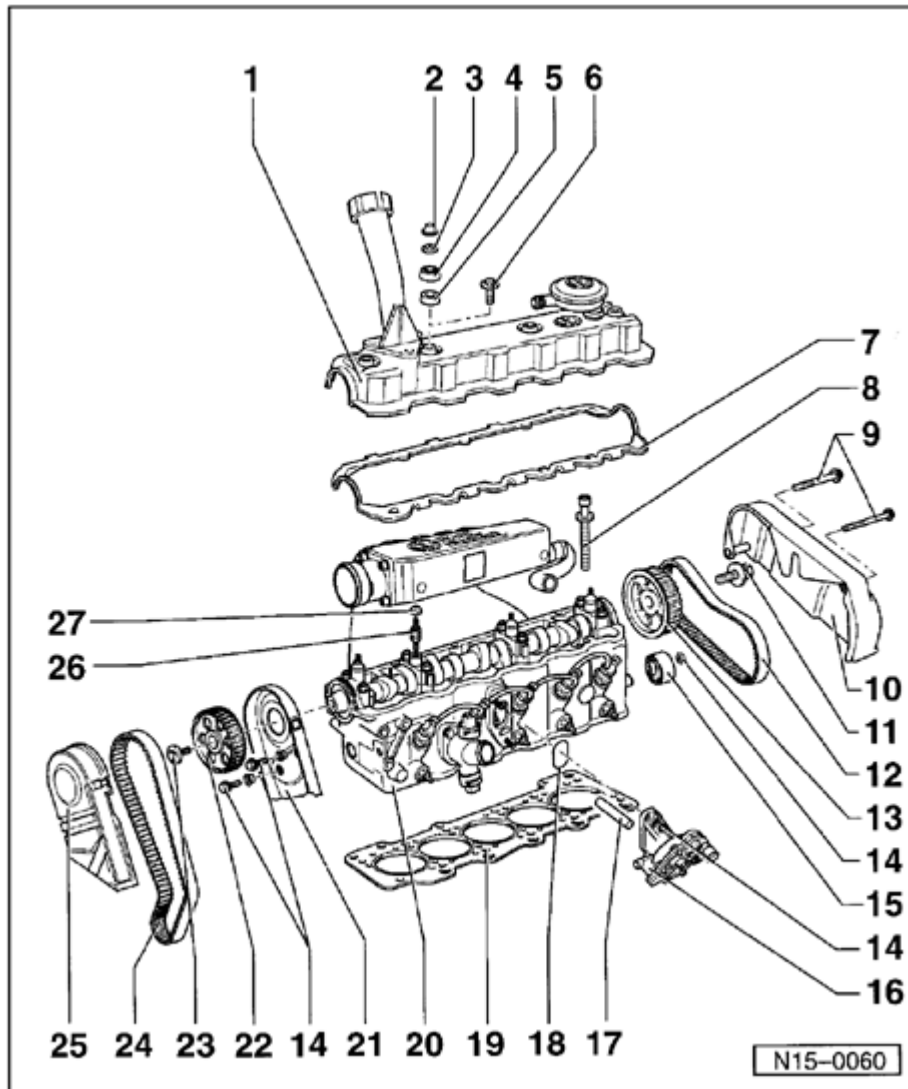
20 - Cylinder head

- ◆ Check for distortion ⇒ [Fig. 1](#)
- ◆ Installing ⇒ [Page 15-10](#)
- ◆ If replaced replace the complete coolant
- ◆ Removing and installing injectors for Engine code AAB:

⇒ *Repair Manual , 2.4 Liter 5-Cyl. 2V Diesel Fuel Injection & Glow Plug, Repair Group 23; Servicing fuel injection system; Removing and installing injectors*

21 - Rear toothed belt guard

- ◆ 02.95 ➤
- ◆ ➤01.95 ⇒ [Page 13-9](#) , item 7



22 - Camshaft sprocket

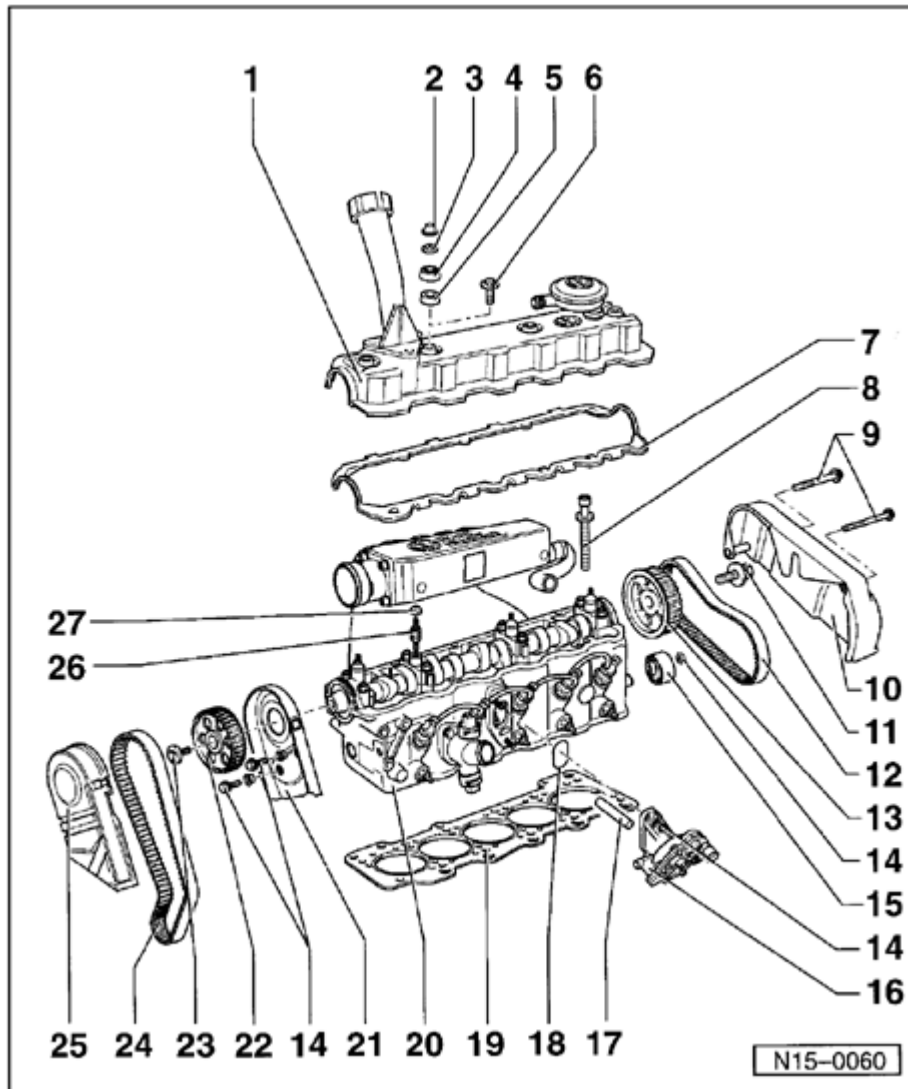
- ◆ Drive off camshaft taper using hammer and drift through toothed belt guard openings
- ◆ Note position when installing toothed belt:

Vehicles 01.95 ⇒ [Page 13-34](#) , Removing, installing and tightening camshaft toothed belt;

Vehicles 02.95 ⇒ [Page 13-45](#) , Removing, installing and tightening camshaft toothed belt

23 - Camshaft sprocket securing bolt

- ◆ Observe steel type marking on bolt head:
 - 8.8 = 85 Nm
 - 10.9 = 100 Nm
- ◆ Use counter-hold 3036 to loosen and tighten



24 - Camshaft toothed belt

- ◆ Mark direction of rotation before removing
- ◆ Check for wear
- ◆ Do not kink
- ◆ Removing, installing and tightening:
Vehicles ➤ 01.95 ⇒ [Page 13-34](#) ; Vehicles
02.95 ➤ ⇒ [Page 13-45](#)

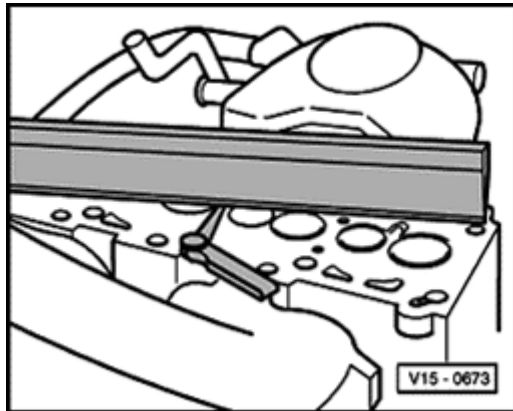
25 - Toothed belt guard - upper part

26 - 15 Nm

- ◆ Engine code: AAB

27 - Lower sealing cone

- ◆ Engine code: AAB
- ◆ Replace if damaged



A Fig. 1 Checking cylinder head for distortion

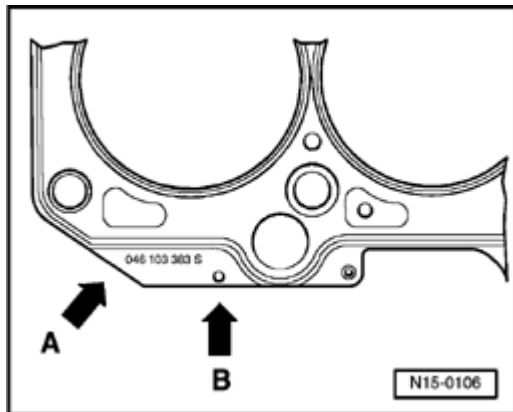
Special tools and equipment required

- ◆ Knife edge straight edge
- ◆ Feeler gauge

Max. permissible distortion: 0.2 mm

Note:

Reworking diesel cylinder heads is not permissible.

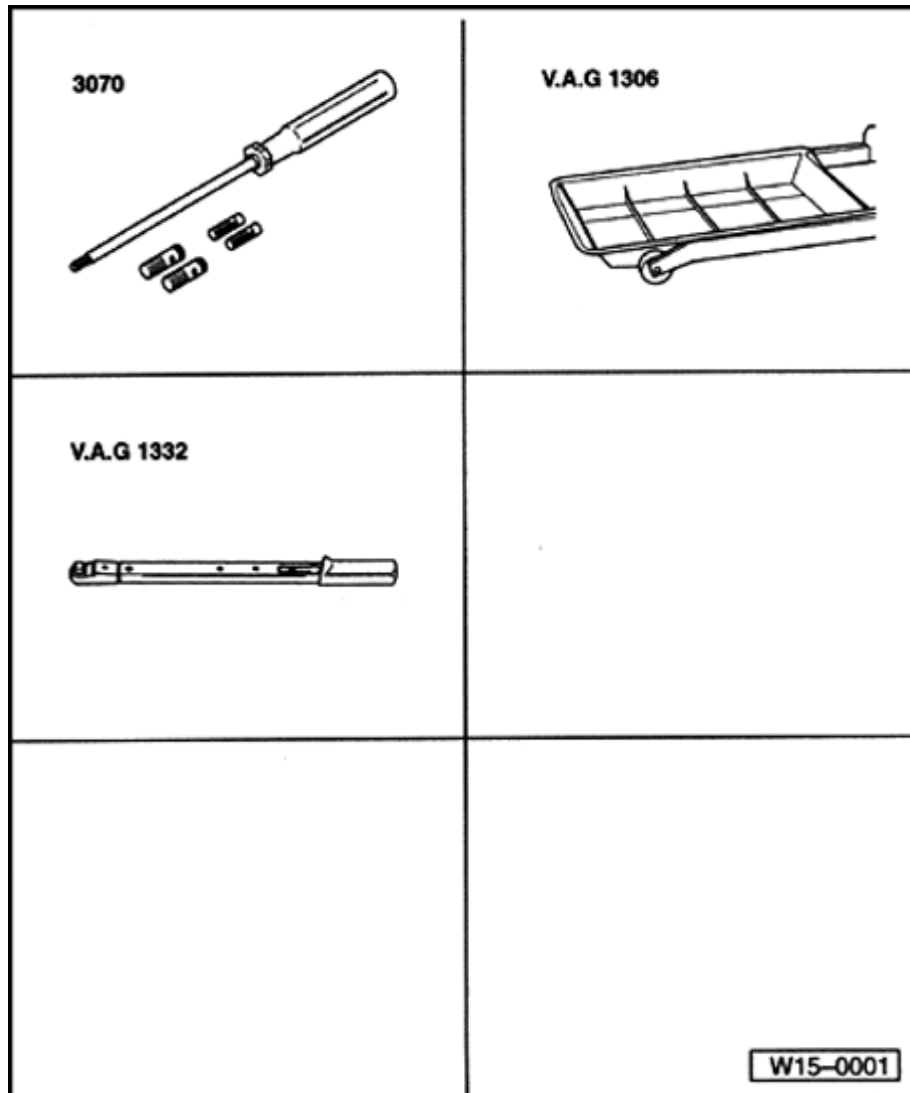


A Fig. 2 Cylinder head gasket identification

- ◆ Part No. = Arrow A
- ◆ Holes/notches = Arrow B

Note:

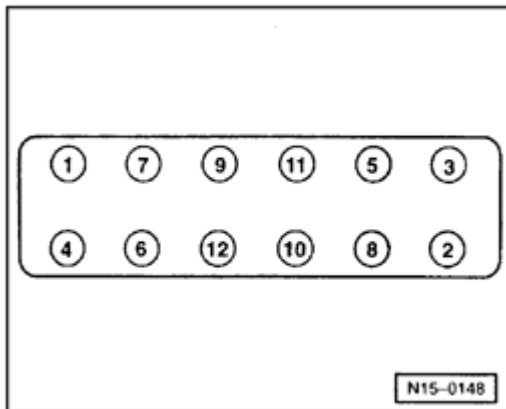
Different thicknesses of cylinder head gasket are installed depending on the piston projection. When replacing the cylinder head gasket, install a new gasket with the same identification.



Cylinder head, removing and installing

Special tools and equipment required

- ◆ 3070 Installing tool with guide pins
- ◆ VAG 1306 Drip tray
- ◆ VAG 1332 (40 to 200 Nm) Torque wrench



Removing

- Maintain sequence when loosening and tightening cylinder head bolts.

Installing

WARNING!

When doing any repair work, especially in the engine compartment, due to the cramped conditions, pay attention to the following:

- ◆ **Route all sorts of lines (e.g. for fuel, hydraulics, EVAP system, coolant, refrigerant, brake fluid and vacuum lines and hoses) and electrical wiring so that the original positions are restored.**
- ◆ **Make sure sufficient clearance to all moving or hot components.**

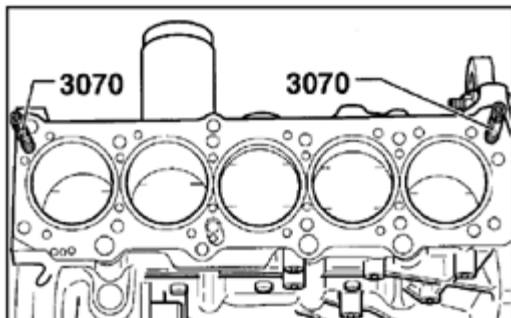
Note:

- ◆ *Always replace cylinder head bolts.*
- ◆ *In cases of repair carefully remove gasket remains from cylinder head and cylinder block. Make sure that no long grooves or scratches are created. When using abrasive paper do not use a grade less than 100.*
- ◆ *Carefully remove emery and abrasive remains.*
- ◆ *Remove new cylinder head gasket from packaging, just before installation.*



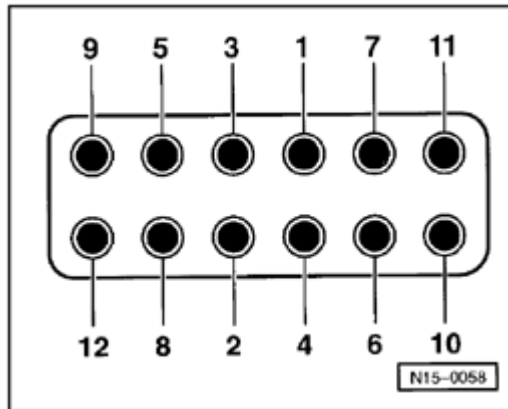
- ◆ *Handle gasket extremely carefully. Damaging the silicone layer or the indented area will lead to leaks.*
- ◆ *Vehicles ▶01.95 with soft material cylinder head gasket. In cases of repair install a new metal cylinder head gasket.*
- ◆ *Replace swirl chambers before installing metal cylinder head gasket on vehicles with engine code AAB ⇒ [Page 15-42](#) .*

- Turn crankshaft to TDC marking before installing cylinder head.
- Turn crankshaft against engine direction of rotation until no piston is at TDC.
- Place cylinder head gasket on.



A

- To center, screw guide pins from 3070 into the outer threaded holes on the intake side.
- Install cylinder head, screw in 10 remaining cylinder head bolts and tighten hand tight.
- Remove guide pins with removal tool from 3070 and install cylinder head bolts.



A

- Tighten cylinder head in four stages in sequence shown as follows:

- 1. Tighten initially with torque wrench:

Stage I = 40 Nm

Stage II = 60 Nm

- 2. Turn further with normal wrench:

Stage III = $\frac{1}{4}$ turn (90°)

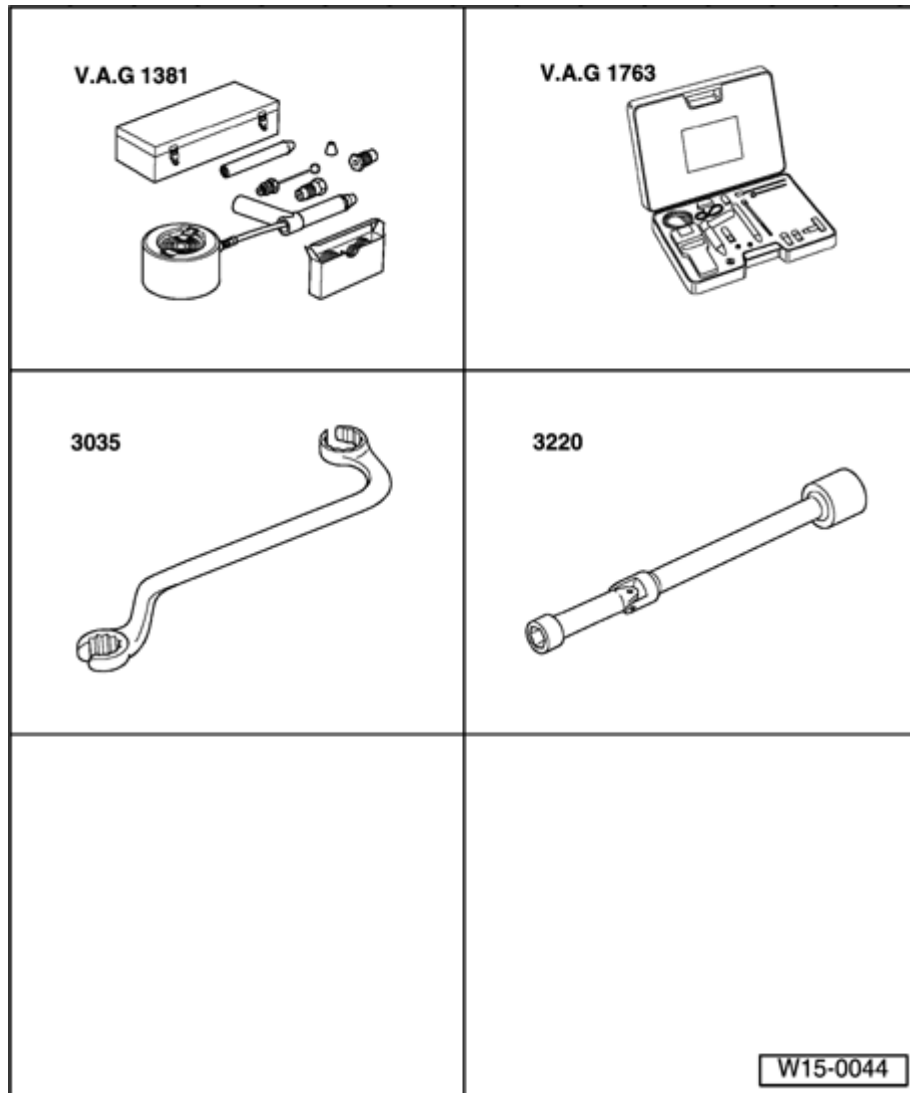
Stage IV = $\frac{1}{4}$ turn (90°)

Note:

◆ *Loosening cylinder head: Reverse sequence.*

◆ *Pulling-down cylinder head after repairs is not necessary.*

- After tightening the cylinder head turn camshaft so that the cams for No. 1 cylinder point evenly upward. Turn crankshaft, in engine direction of rotation, to TDC before installing toothed belt.



Compression pressures, checking

Special tools and equipment required

- ◆ VAG 1381 Compression tester
- ◆ VAG 1763 Compression tester
- ◆ 3035 Ring wrench
- ◆ 3220 Joint wrench
- ◆ VAG 1331 Torque wrench (5 - 50 Nm)
- ◆ VAG 1332 Torque wrench (40 - 200 Nm)



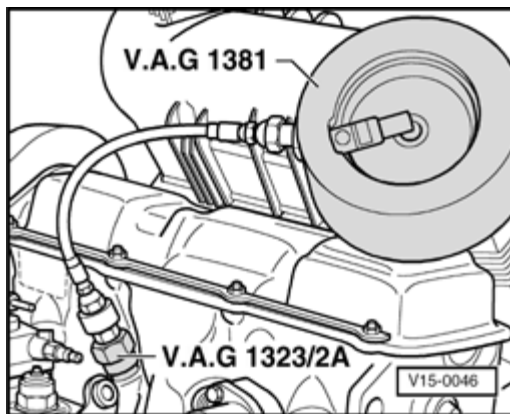
Test conditions

- Engine oil temperature min. 30 ° C.

Test sequence

Engine code: AAB

- Pull electrical wire off engine stop device on injection pump, insulate and lay to side.
- Remove injection lines with slotted wrench 3035.
- Unscrew all injectors and take out heat shields.



A

- Screw in adapter VAG 1323/2A in place of the injectors. Insert old heat shield between adapter and cylinder head.
- Screw compression pressure recorder VAG 1381 or VAG 1763 into the adapter by hand.

Note:

Using the compression tester ⇒ Operating instructions.

- Operate starter until tester shows no further pressure increase.



Compression pressure:

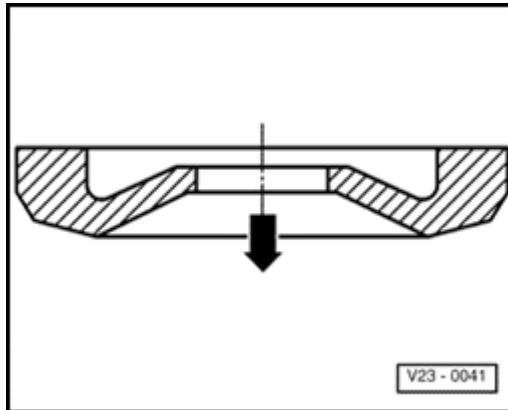
New: 34 bar

Wear limit: 26 bar

Permissible difference between all cylinders: 5 bar

Note:

Always replace heat shield seals between cylinder head and injectors.



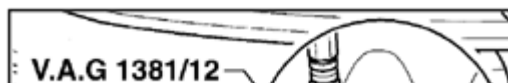
▲ Installation position of heat shield: Arrow points toward cylinder head.

◆ Tightening torques:

- Injector lines = 25 Nm
- Injectors = 70 Nm

Engine code: ACV

- Pull connector off fuel cut-off valve/commencement of injection valve on injection pump.
- Separate connector to quantity adjuster on injection pump.
- Remove all glow plugs using socket wrench 3220.



▲ - Screw in adapter VAG 1381/12 in place of the glow plugs.

- Check compressions with compression tester VAG VAG 1763.

**Note:**

Using the compression tester ⇒ Operating instructions.

- Operate starter until tester shows no further pressure increase.

Compression pressure:

New: 25 to 31 bar

Wear limit: 24 bar

Permissible difference between all cylinders: 5 bar

- Install glow plugs with socket and jointed extension 3220

Tightening torque: 15 Nm.