

# PARTS & SERVICE NEWS

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(C)

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**SUBJECT:** HEAD GASKET UPDATE

**PURPOSE:** Release new head gasket with aluminized steel coating for better corrosion resistance

**APPLICATION:** WA500-1LE Wheel Loader Serial Number A61001 and up  
WA500-3L Wheel Loader Serial Number A71001 and up

**FAILURE CODE:** A130Z9

**DESCRIPTION:**

This Parts & Service News announces the release of a new cylinder head gasket for the N14 Series engine.

The new cylinder head gasket was introduced into production on January 3, 2000. The engine serial number first was 11991288. The new gasket, Part Number 1253 429 H5, supersedes the old gasket, Part Number 1310 901 H2.

The new gasket's sealing elements are similar to those for the old gasket. The distinction between the new and old gaskets is the coating. The new coating is aluminized steel, while the coating for the old gasket is molybdenum/Teflon.

The aluminized steel coating will provide equal or better corrosion resistance compared to the old gasket's coating. However, the primary feature of the aluminized steel coating is that it is tougher and thinner than the molybdenum/Teflon coating. This feature will aid in long-term cylinder head bolt load retention and thus reduce the likelihood of gasket liner wear and combustion leaks.

Old Gaskets Kits (Gasket, P/N 1310 901 H2)	New Gasket Kits (Gasket, P/N 1253 429 H5)
1307 287 H91	1307 287 H92
1307 296 H91	1307 296 H92

Customer complaints that can be caused by head gaskets leaks include the following:

- External coolant or oil leak at the cylinder head.
- Loss of engine coolant, cold cab temperatures (cold weather), or engine overheat (warm weather).
- "Chirping" noise.

## External Coolant or Oil Leak

### Preparatory

Check the coolant level. Refer to NT14 Engine Shop Manual.



**WARNING!** When using a steam cleaner, wear safety glasses or a face shield, as well as protective clothing. Hot steam can cause serious personal



**WARNING!** Wear appropriate eye and face protection when using compressed air. Flying debris and dirt can cause personal injury.

Start the engine, and allow it to warm to operating temperature. With the engine running, check for the source of the leak.

If an external leak is found but it is not possible to determine which cylinder head is leaking, steam-clean the engine and dry the engine with compressed air. Pay particular attention to the small gap between the cylinder heads.

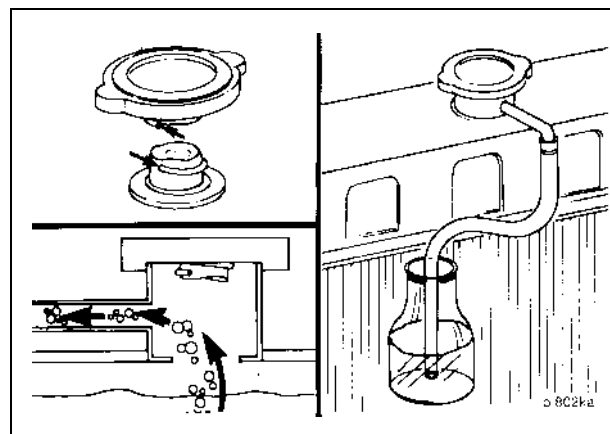
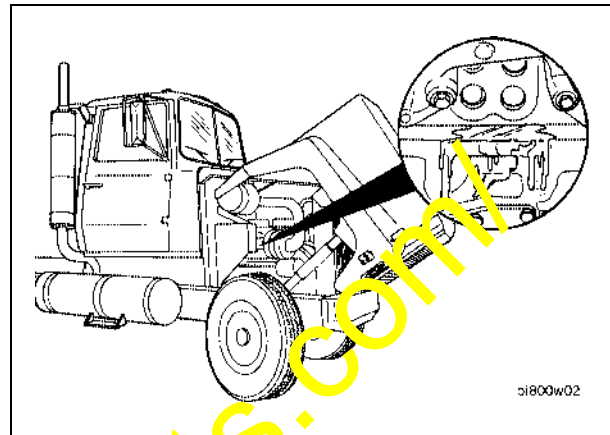
**NOTE:** The use of dye in the coolant or oil and a black light can be useful in this troubleshooting process.

If the external leak originates from a head gasket, repair the failed head gasket in accordance with the Cooling System- Air or Combustion Gas Test in this document.

### Cooling System - Air or Combustion Gas Test

Follow the inspection and repair guidelines in the Troubleshooting and Repair Manual, N14 Series Engine, Bulletin 3666142, for the following procedures:

- Initial Check, Procedure 008-019
- Leak Test. Procedure 008-019, complete the following test in accordance with the manual:
  - Fan shutter or heater air control valve
  - Air compressor
  - Aftercooler core
  - Cylinder head and cylinder liner.



### Combustion Gas Leak

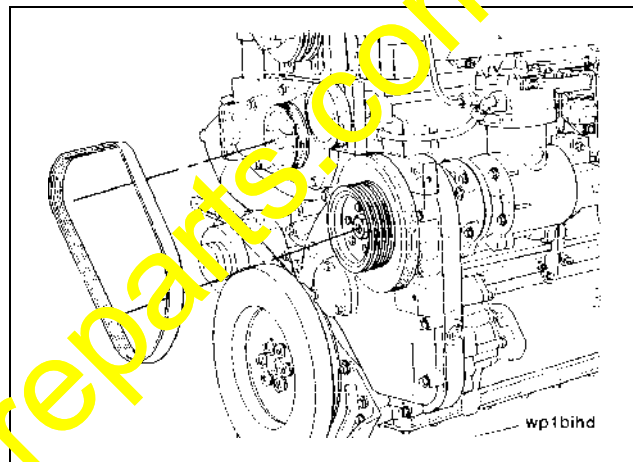
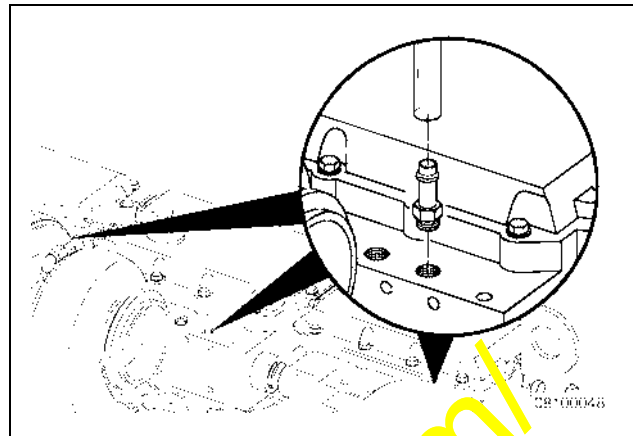
Remove the front most pipe plug from each of the rocker water manifolds, and install a short pipe nipple.

NOTE: Optionally, install 305mm[1 ft] of clear tygon tubing onto the nipple, and fill the tube with coolant.

Remove the water pump drive belt. Refer to procedure in the Troubleshooting and Repair Manual, N14 Series Engine. Bulletin 3666142.

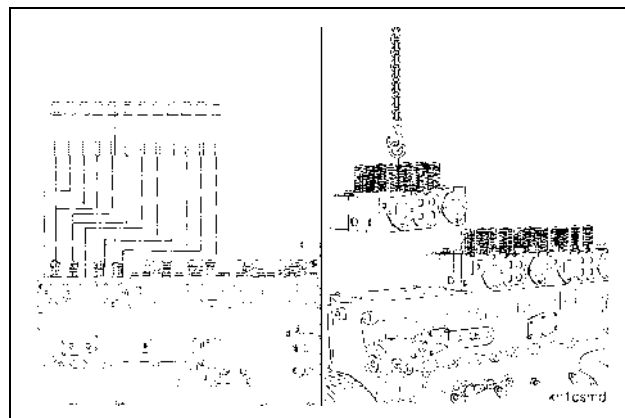
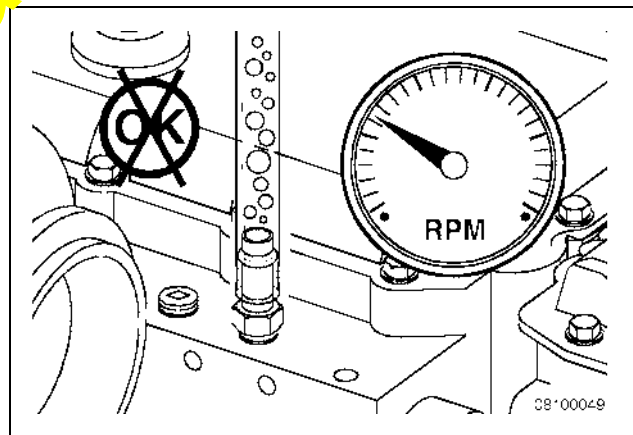
Run the engine, and inspect for the presence of bubbles "percolating" from the pipe nipples or in the clear tubing if used.

The presence of bubbles indicates a combustion leak. Repair the combustion leak in accordance with Combustion Leak Repair Procedure in the document.



### Combustion Leak Repair Preparatory

Remove the cylinder head(s) with the leaking gasket. Refer to procedure in the Troubleshooting and Repair manual, N14 Series Engine. Bulletin 3666142.



NOTE: Combustion leaks occur almost exclusively between adjacent cylinders under a shared head (i.e, directly between cylinders 5 and 6).

Remove and inspect the cylinder head gasket for the following:

- Grommets for bolt holes, one and/or two will be burnt. The grommets will either be completely missing or will be partially missing, with the remainder being brittle or crumbly.
- A darkened area that appears to be burnt across the top surface of the gasket between bolt holes.

It is necessary to examine the liner protrusion for both liners under a gasket with a chamber leak. Liner inspection/repair is the key to reducing the probability of repeat combustion leak. Accurately measure the liner protrusion. The liner protrusion will be measured for all the liners exposed after the cylinder head has been removed.

Protrusion will be measured in four locations 90 degrees apart from one another.

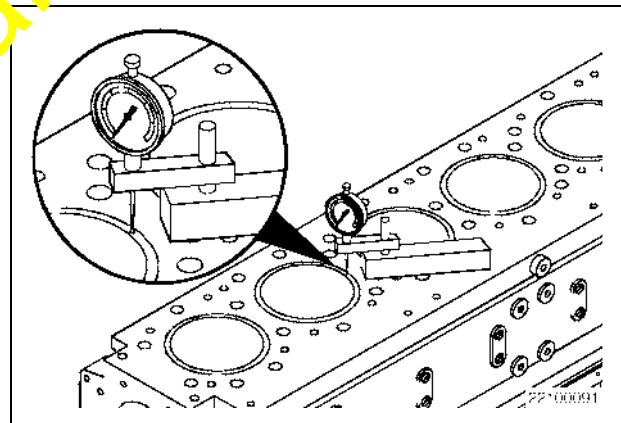
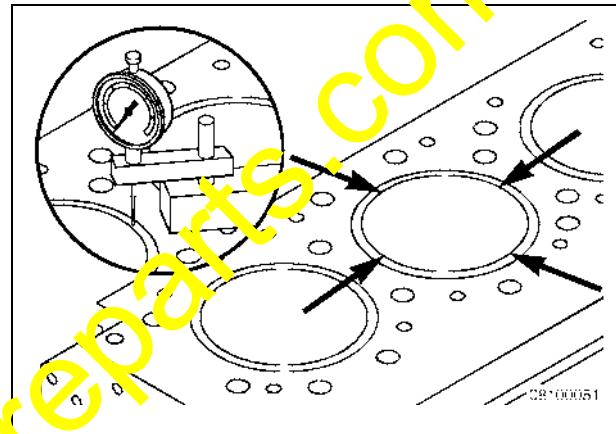
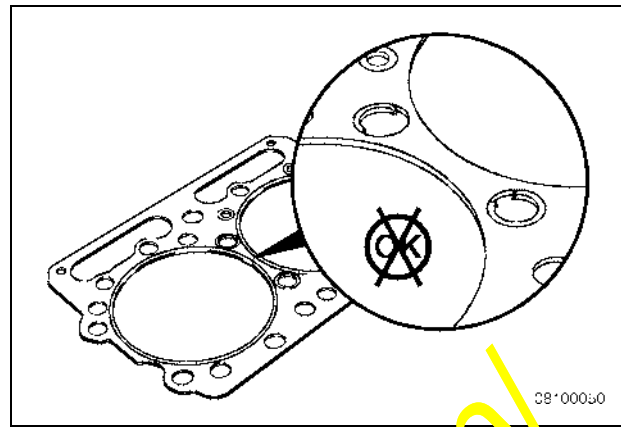
Two out of the four measurements will be taken at the front and back of the cylinder liner, along the crankshaft centerline.

The remaining two measurements will be taken perpendicular to the crankshaft centerline (one each on the exhaust side and intake side).

NOTE: If difficulty is experienced in obtaining the measurements along the crankshaft centerline, it is recommended that counterbore depth gauge be used to measure the protrusion.

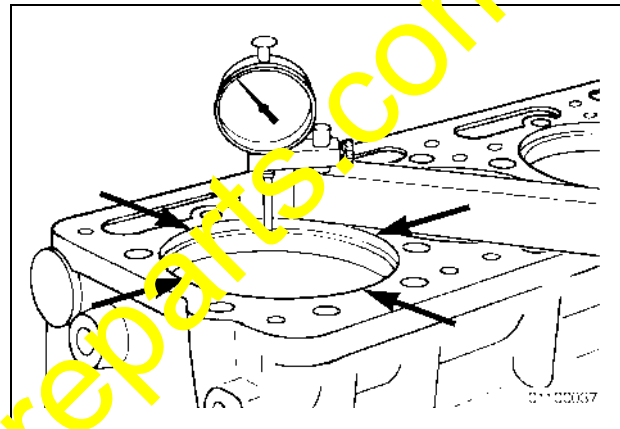
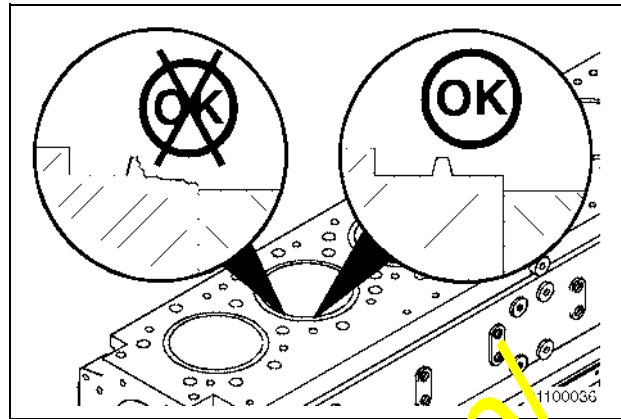
The inspection criteria are as follows:

- Overall protrusion to be within 0.102 to 0.178 mm [0.004 to 0.007 in]
- No more than 0.025-mm [0.001-in] protrusion variation around a liner
- No more than 0.025-mm[0.001-in] protrusion variation between adjacent liners under a shared cylinder head (1-2, 3-4, 5-6).



Examine the top surface of the liner flange for evidence of erosion damage to the fire bead. Inspect the polishing or erosion on the liner flange and/or damage or wear to the fire bead. NOTE: If any protrusion measures out of specification or if either liner is eroded, worn or damaged, then both liners under a shared cylinder head will have to be removed to perform an effective repair.

Liner protrusion measurements that are out of specification can indicate a problem with the block counterbores. Inspect the block counterbores. Refer to Procedure in the Troubleshooting and Repair Manual, N14 Series Engines, Bulletin 3666142. Most counterbores do not need to be machined. A good repair can be completed by appropriately shimming the liners.



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## Block Counterbore Measurement

Each counterbore **must** be measured in eight locations (two measurements at four different locations, 90 degrees apart). Similar to the protrusion measurement procedure, two positions will be on the crankshaft centerline (front and back) and one position each on the exhaust side and the intake side. At each position, a measurement is to be taken as close as possible to the outer diameter of the bore without intruding into the corner radius. Another measurement is to be taken as close as possible to the inner diameter without slipping into the liner bore. The outer diameter measurement **must not** be less than the inner diameter measurement. If the outer diameter measurement is less than the inner diameter measurement, counterbore machining is necessary.

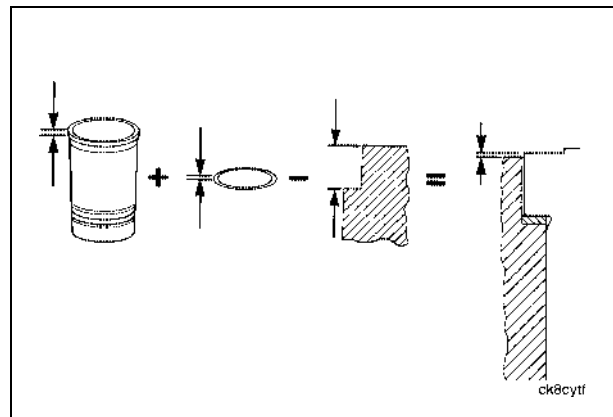
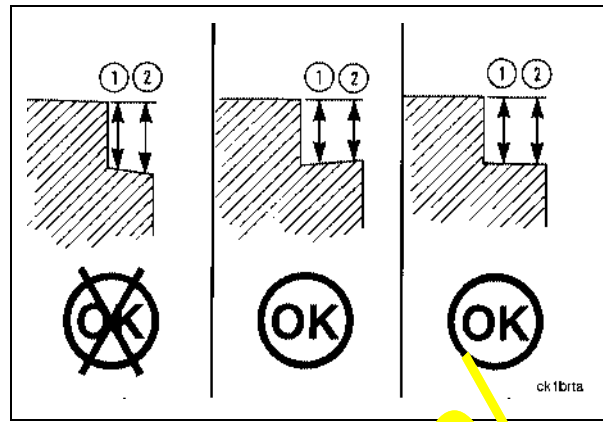
The inspection criteria are as follows:

- Overall counterbore depth **must** be 9.398mm[0.370] in.
- Depth variation around any counterbore **must not** be greater than 0.0254 mm [0.001 in].
- Depth variation between counterbore pairs under a shared cylinder head (for example, one and two, three and four, or five and six) **must not** be than 0.0254 mm [0.001 in].
- The outer diameter depth **must never** be less than the inner diameter depth. The outer diameter depth must not be over 0.0254 mm [0.001 in] greater than the inner diameter depth.

However, if inspection of the block counterbores, according to this procedure, indicates out of specification counterbores that need machining, refer to the NT Counterbore Troubleshooting and Repair Manual, Bulletin 3810450.

Replace both liners under the head gasket that failed. Make certain that the new liners meet the following protrusion specifications (shims as required):

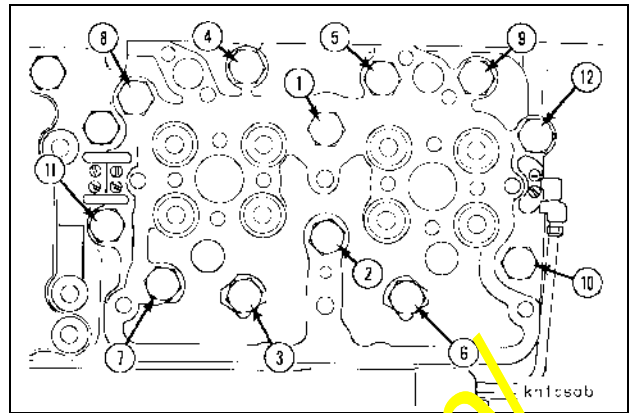
- Overall protrusion will be within 0.102 to 0.178 mm [0.004 to 0.007 in]
- No more than 0.025-mm [0.001-in] protrusion variation around a liner
- No more than 0.025-mm [0.001-in] protrusion variation between adjacent liners under a shared cylinder head.



Install the new head gaskets. Refer to Bulletin 3666142.

Use the following cylinder head bolt torque procedure:

- Step 1 - tighten the cylinder head capscrews to 136 Nm [100 ft-lb].
- Step 2 - tighten the cylinder head capscrews to 298 Nm [220 ft-lb].
- Step 3 - retighten the cylinder head capscrews to 298 Nm [220 ft-lb].
- Step 4 - rotate the cylinder head capscrews 90 degrees in a **clockwise** direction.



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