

TECHNICAL INFORMATION



Use of Land Rover Tools for Valve Guide Cleaning

No: 12/01/00/NAS
Ref:
Issue: 1
Date: 09/29/00

AFFECTED VEHICLE RANGE:

Range Rover (LH & LP)	All
Discovery (LJ & LT)	All
Defender (LD)	All

SITUATION:

CYLINDER HEAD OVERHAUL DIFFICULTIES

Cylinder head overhauls, particularly in cases of exhaust valve sticking, have previously been carried out using a single Valve Guide Cleaner (LRA-12-003) as directed in the Land Rover V8 Engine Overhaul Manual. The use of the single cleaner has in some cases been difficult. Also repeat valve stick failures due to further carbon build-up over time have occurred.

RESOLUTION:

STEPPED SET OF VALVE GUIDE CLEANER TOOLS

Land Rover has now introduced a stepped set of three cleaners, designed to increase the exhaust valve guide internal diameter by 10 microns (0.0004"), and to ensure that all carbon and valve guide material can be removed as easily as possible.

The process set out in this TIB should **always** be used where exhaust valve stick is suspected or confirmed to have occurred. This process replaces the exhaust valve guide process described in the Engine Overhaul Manual and should be used for all valve replacement and cylinder head overhaul processes.

TOOL INFORMATION:



CAUTION: Inlet valve guides should be de-carbonized using cleaner LRA-12-003 only.

The two new Valve Guide Cleaners identified below (LRA-12-007 and LRA-12-008) are **ONLY** for use on exhaust valve guides, and **MUST NOT** be used on inlet valve guides. The carbon cleaning function of LRA-12-008 is *not* required for inlet valve guides and inlet valve guides should *not* be enlarged 10 microns using LRA-12-007.

LRA-12-008.....Cleaner – 1st under-size
LRA-12-003.....Cleaner – standard size
LRA-12-007.....Cleaner – 1st over-size (+10 micron)
LRA-12-005.....Cleaner T-handle
LRA-12-004.....Valve guide cleaning brush

WARRANTY CLAIMS:

12.29.89/43.....Time 4.20 hrs. – All models
Cylinder head reconditioning and valve guide cleaning

Also claim remove and install cylinder heads:

12.29.01Time 7.15 hrs – Range Rover Bosch EMS
Time 7.55 hrs – Range Rover GEMS
Time 6.70 hrs – Discovery Series II
Time 5.90 hrs – Defender

12.29.01/20.....Time 7.25 hrs – Discovery Series I

FAULT CODE: F

Normal warranty policy and procedures apply

TIB	CIRCULATE:	Service Mgr	Warranty	Workshop	Body Shop	Parts
12/01/00/NAS	TO	X	X	X	X	X

REPAIR PROCEDURE



NOTE: Vehicles with Bosch Engine Management systems require Prior Authorization before performing valve stick repairs.

1. Confirm exhaust valve stick occurrence by identifying appropriate misfire codes via TestBook.
2. Remove rocker shaft and valve springs.
3. Verify sticking exhaust valve diagnosis before head removal by manually moving the valves.
4. Refer to the Land Rover Engine Overhaul Manual on latest RAVE CD and remove cylinder heads.
5. Remove inlet and exhaust valves.



CAUTION: The Valve Guide Cleaners are hand tools only, and MUST NOT be used with any power tool. Use of power tools will lead to premature wear of the tool and damage to the valve guide.



CAUTION: The process outlined in Steps 6 through 8 should be used to clean exhaust valve guides only. Perform intake valve guide cleaning as described in Step 9.



NOTE: Cleaner LRA-12-008 is designed to match the nominal size of the valve guide. It is possible that a small amount of valve guide material will be removed from valve guides that are manufactured at the lower end of the tolerance band.

6. Insert cleaner LRA-12-008 **by hand** into each exhaust valve guide from the combustion face side of the cylinder head using T-handle LRA-12-005.
 - Turn cleaner carefully clockwise to clear out all carbon deposits from the guide.
 - Continue turning until the cleaner can be withdrawn from the other end of the guide to prevent burrs being formed on the inner diameter of the guide.
 - Clear out all loose material from the valve guides using the valve guide brush LRA-12-004.
 - Ensure that no carbon deposits or valve guide material remain inside the guides.



NOTE: Cleaner LRA-12-003 is designed to enlarge the valve guide to the top of the tolerance band. A small amount of valve guide material is likely to be removed during this process.


7. Insert cleaner LRA-12-003 **by hand** from the combustion face side of the cylinder head using T-handle LRA-12-005.
 - Turn cleaner carefully clockwise.
 - Continue turning until the cleaner can be withdrawn from the other end of the guide.
 - Clear out all loose material from the valve guides using the valve guide brush LRA-12-004.
 - Ensure that no deposits or valve guide material remain inside the guides.



NOTE: Cleaner LRA-12-007 is designed to enlarge the valve guide to 10 microns (0.0004”) oversize. A small amount of valve guide material will be removed during this process.

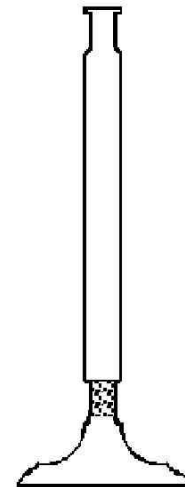
8. Insert cleaner LRA-12-007 **by hand** from the combustion face side of the cylinder head using T-handle LRA-12-005.
 - Turn cleaner carefully clockwise.
 - Continue turning until the cleaner can be withdrawn from the other end of the guide.
 - Clear out all loose material from the valve guides using the valve guide brush LRA-12-004.
 - Ensure that no valve guide material remains inside the guides.

9. If carbon deposits are present in the **inlet** valve guides, insert cleaner LRA-12-003 **by hand** into each valve guide using T-handle LRA-12-005.
 - Turn cleaner carefully clockwise to clear out all carbon deposits from the guide.
 - Continue turning until the cleaner can be withdrawn from the other end of the guide.
 - Clear out all loose material from the valve guides using the valve guide brush LRA-12-004.
 - Ensure that no carbon deposits or valve guide material remain inside the guides.
10. Clean all carbon deposits from both inlet and exhaust valves, including the valve stems.

 **NOTE: Exhaust valves should only be replaced with new items if the existing exhaust valves are not of the “carbon-break” type or the valve is damaged. Carbon-break valves are easily identified by the reduced diameter section on the valve stem just above the valve head (Figure 1). Valve replacement is unnecessary in most cases.**

11. Lap-in all valves using a suitable valve grinding compound.
12. Remove all traces of grinding compound.
13. Assemble cylinder head using new valve stem seals on all valves.
14. Refer to the Land Rover Engine Overhaul Manual and install the cylinder heads.
15. Start the engine and check for any leaks.
16. Clear any codes stored in the engine ECU, and perform drive cycle C.
17. Check for any newly stored codes using TestBook.
18. If new codes are stored, follow appropriate diagnostic procedures.

Figure 1



Carbon-break Valve