9310 and 9330 Tractor Service Manuals
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Reprinted

Rac 8-83352

Printed in U.S.A.
December, 1995 (Revised November, 1998)

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Section

1001

GENERAL INFORMATION AND SPECIFICATIONS

For 9310 - 9330 Series Tractor

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Rac 7-65400

Printed in U.S.A.
November, 1995

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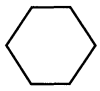
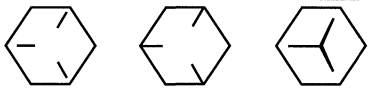
NOTE: Case Corporation reserves the right to make improvements in design or changes in specifications at any time without incurring any obligation to install them on units previously sold.

GENERAL TORQUE SPECIFACTION TABLE

SAE FASTENER TORQUE CHART

NOTE: *Use these torques, unless special torques are specified. Values are for UNC and UNF thread fasteners, plated or unplated, as received from supplier. Fasteners can be dry or lubricated with normal engine oil. Values do not apply if graphite, moly-disulphide or other extreme pressure lubricant is used.*

SAE Grade No.	2				5				8*			
Bolt head identification (See Note 1)												
Bolt Size	LB FT		Nm		LB FT		Nm		LB FT		Nm	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
1/4	5	6	7	8	9	11	12	15	12	15	16	20
5/16	10	12	14	16	17	20.5	23	28	24	29	33	39
3/8	20	23	27	31	35	42	48	57	45	54	61	73
7/16	30	35	41	47	54	64	73	87	70	84	95	114
1/2	45	52	61	70	80	96	109	130	110	132	149	179
9/16	65	75	88	102	110	132	149	179	160	192	217	260
5/8	95	105	129	142	150	180	203	244	220	264	298	358
3/4	150	185	203	251	270	324	366	439	380	456	515	618
7/8	160	200	217	271	400	480	542	651	600	720	814	975
1	250	300	339	406	580	696	787	944	900	1080	1220	1464
1-1/8					800	880	1085	1193	1280	1440	1736	1953
1-1/4					1120	1240	1519	1681	1820	2000	2468	2712
1-3/8					1460	1680	1980	2278	2380	2720	3227	3688
1-1/2					1940	2200	2631	2983	3160	3560	4285	4827

NOTE: *Bolt head identification marks as per grade. Manufacturing marks will vary.* **Thick nuts must be used with Grade 8 bolts.*

METRIC FASTENER (ISO) TORQUE CHART

NOTE: *Use these torques, unless special torques are specified. Values are for UNC and UNF thread fasteners, plated or unplated, as received from supplier. Fasteners can be dry or lubricated with normal engine oil. Values do not apply if graphite, moly-disulphide or other extreme pressure lubricant is used.*

ISO Grade No.	8.8				10.9				12.9			
Bolt head identification (See Note 1)												
Bolt Size	LB FT		Nm		LB FT		Nm		LB FT		Nm	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
M4	3	4	2	3	4	5	3	4				
M5	6.5	8	5	6	9.5	11	7	8				
M6	10.5	12	8	9	15	17.5	11	13				
M8	26	31	19	23	37	43	27	32				
M10	52	61	38	45	73	87	54	64				
M12	90	107	66	79	125	150	93	112				
*M14	144	172	106	127	200	245	149	179				
M16	217	271	160	200	310	380	230	280				
M20	434	515	320	380	610	730	450	540				
M24	675	815	500	600	1050	1275	780	940				
M30	1250	1500	920	1100	2000	2400	1470	1770				
M36	2175	2600	1600	1950	3500	4200	2580	3090				

Because of the low ductility of these fasteners, the torque range is to be determined individually for each application. As a general rule, the torque ranges specified for grade 10.9 fasteners can be used satisfactorily on

*M14 is not a preferred size

NOTE: *Bolt head idenficiation marks as per grade. Manufacturing marks will vary.*

STANDARD TORQUE DATA FOR HYDRAULIC TUBES AND FITTINGS

TUBE NUTS FOR 37° FLARED FITTINGS								O-RING BOSS PLUGS, ADJUSTABLE FITTING LOCK NUTS, SWIVEL JIC - 37° SEATS			
SIZE	TUBING O.D.		THREAD SIZE	LB FT		Nm		LB FT		Nm	
	Inches	mm		Min	Max	Min	Max	Min	Max	Min	Max
4	1/4	6.4	7/16-20	9	12	12	16	6	10	8	14
5	5/16	7.9	1/2-20	12	15	16	20	10	15	14	20
6	3/8	9.5	9/16-18	21	24	29	33	15	20	20	27
8	1/2	12.7	3/4-18	35	40	47	54	25	30	34	41
10	5/8	15.9	7/8-14	53	58	72	79	35	40	47	54
12	3/4	19/1	1-1/16-12	77	82	104	111	60	70	81	95
14	7/8	22.2	1-3/16-12	90	100	122	136	70	80	95	109
16	1	25.4	1-51/6-12	110	120	149	163	80	90	108	122
20	1-1/4	31.8	1-5/18-12	140	150	190	204	95	115	129	156
24	1-1/2	38.1	1-7/8-12	160	175	217	237	120	140	163	190
32	2	50.8	2-1/2-12	225	240	305	325	250	300	339	407

Above torque figures are recommended for plain, cadmium or zinc plated fittings, dry or wet installations and swivel nuts either swaged or brazed. These torques are not recommended for tubes 1/2 inch (12.7 mm) O.D. and larger with wall thickness of 0.035 inch (0.889 mm) or less. The torque is specified for 0.035 inch (0.889 mm) wall tubes on each application individually.

Section

2011

AFTERCOOLER

6-830 Diesel Engine

IMPORTANT: *This engine was made using the metric measurement system. All measurements and checks must be made with metric tools to make sure of an accurate reading when inspecting parts.*

CASE CORPORATION

Rac 8-91702 January, 1991 (Revised December, 1994)

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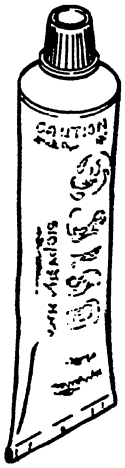
SPECIAL TOOLS



404L94

THREAD SEALANT WITH TEFLON - B17503 6ml TUBE

485L94

THREE BOND SILVER RTV SEALER
J823494 - 3 oz TUBE

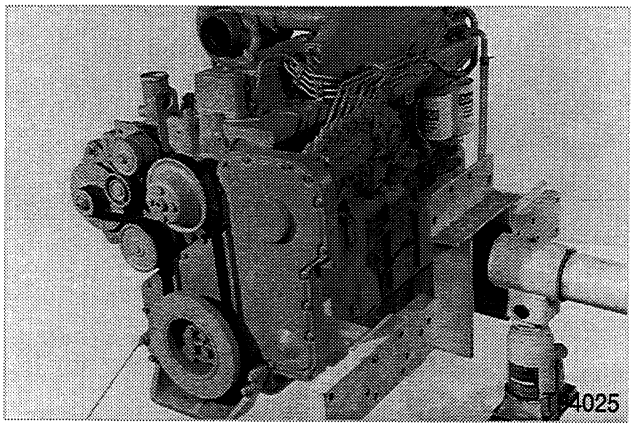
SPECIAL TORQUES

Aftercooler Mounting Bolts ..... 21 to 27 Nm

Crossover Tube Clamps ..... 4 to 6 Nm

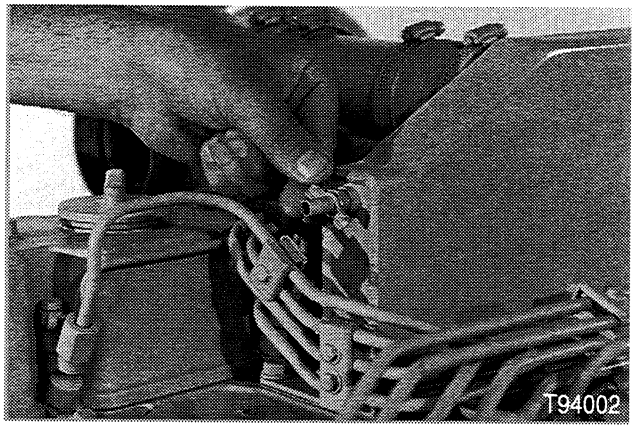
SERVICING THE AFTERCOOLER
Removal

STEP 1



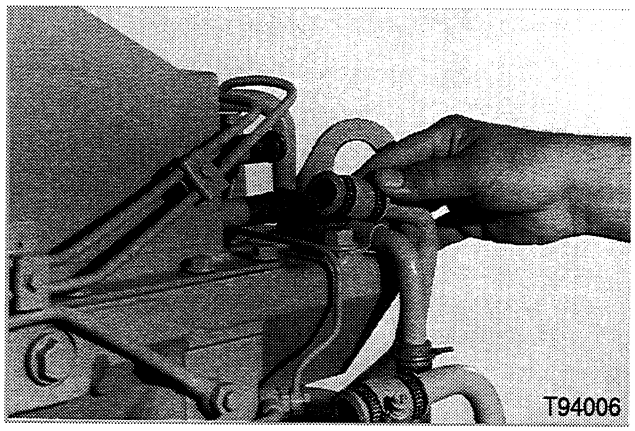
Case 6TA 830 engine.

STEP 2



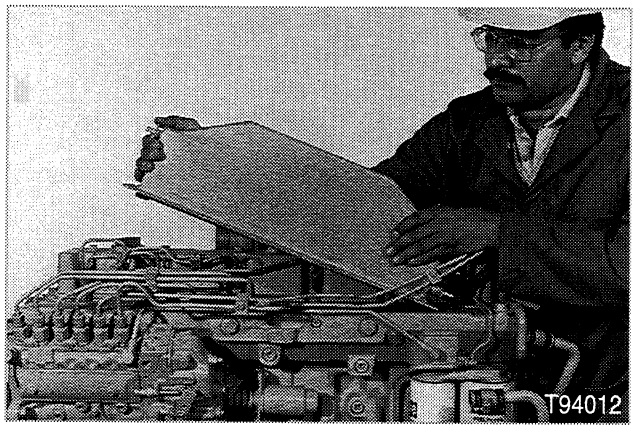
Drain the coolant from the engine. Open the air vent valve on the aftercooler to help drain the coolant.

STEP 3



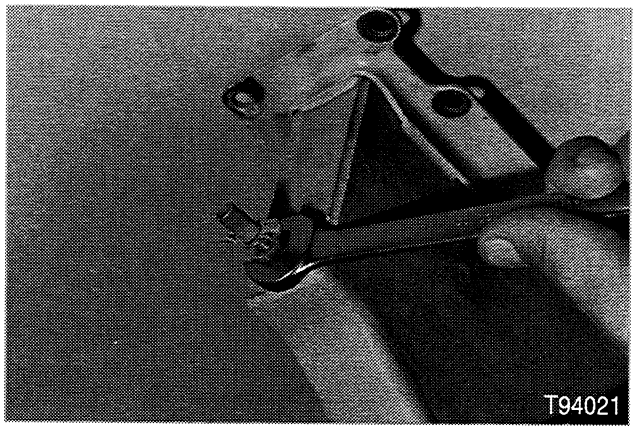
Remove all fuel lines and water hoses from the aftercooler.

STEP 4



Remove the bolts and aftercooler. Discard the gasket. Clean the gasket surfaces. Inspect the housing and core for damage.

STEP 5

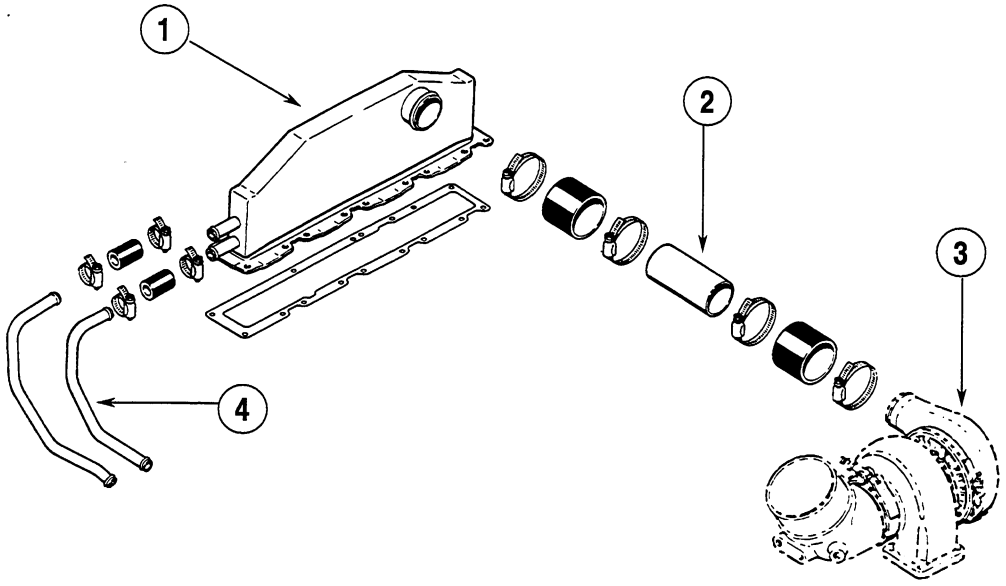


Remove the air vent valve from the aftercooler.

STEP 6

Install a plug in the air vent valve and put a cap on one of the aftercooler water hose tube. Attach regulated air pressure to the other water hose tube. Pressurize the core to 206 kPa (2 bar) (30 PSI) and submerge the aftercooler in water. Inspect for any air leaks. If there leaks or damage, the aftercooler must be replaced.

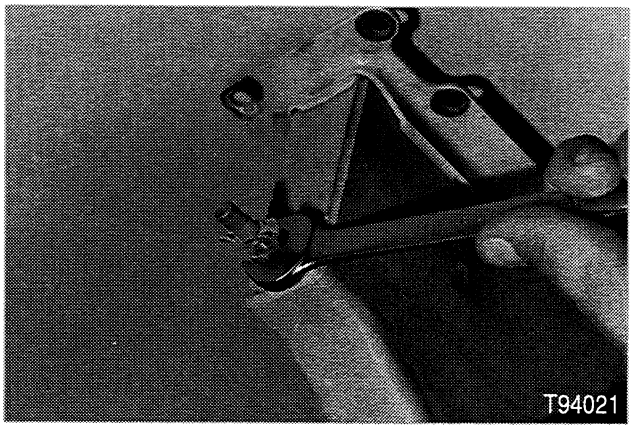
Installation



87L91

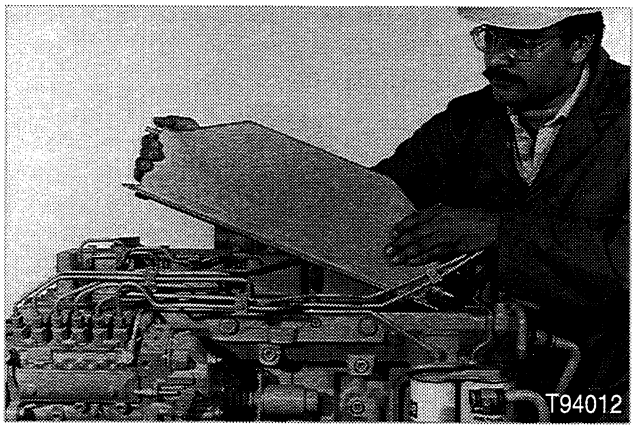
1. Aftercooler
2. Crossover Tube
3. Turbocharger
4. Water Line

STEP 7



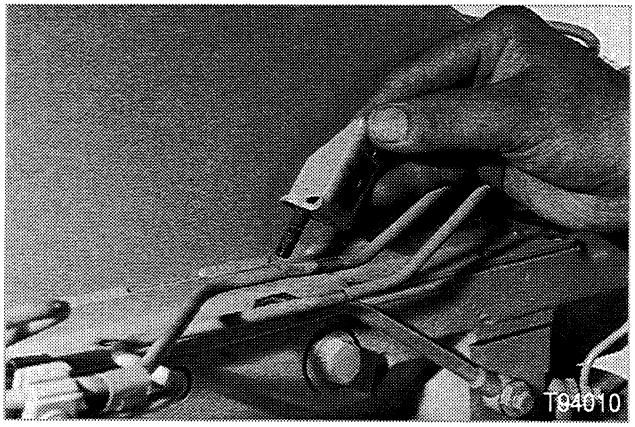
Apply tefflon thread sealant to threads of air vent valve and install in the aftercooler.

STEP 8



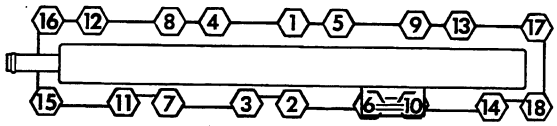
Apply a thin layer of Three Bond RTV Silver Sealer to both sides of a new gasket. Install the gasket and aftercooler on the cylinder head.

STEP 9

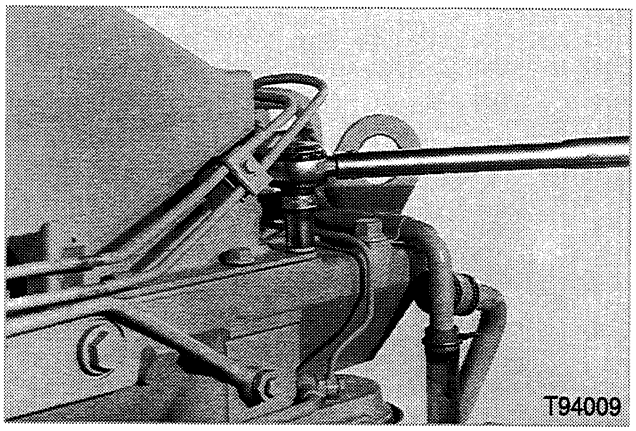


Apply Loctite liquid tefflon thread sealer on the injector line mounting bracker bolts. Install the injector line mounting brackets on the aftercooler.

STEP 10

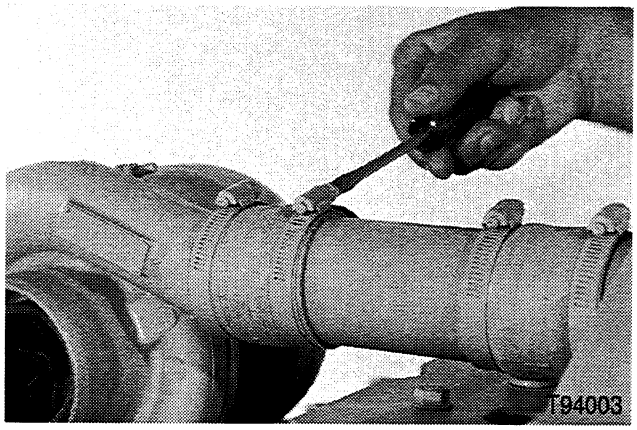


78L91



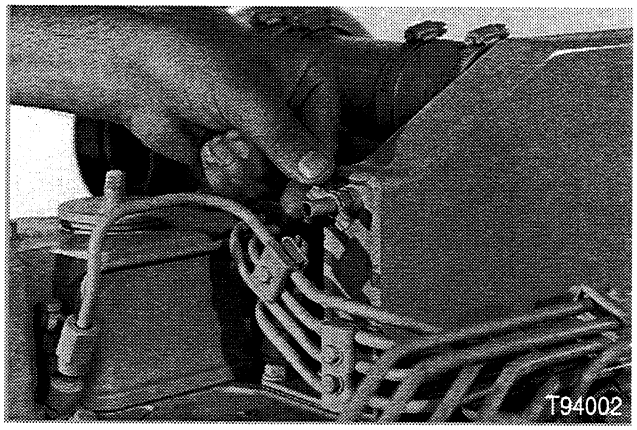
Apply Loctite liquid tefflon thread sealer to the remaining aftercooler bolts. Install the aftercooler mounting bolts and tighten to a torque of 21 to 27 Nm following the torque sequence shown above.

STEP 11



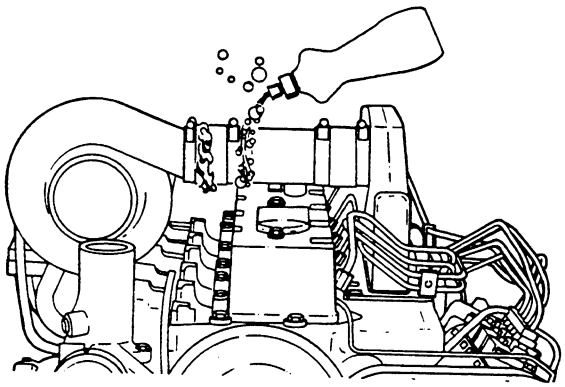
Install the crossover tube, injector tubes and water hoses on the aftercooler and turbocharger. Tighten the water hose clamps to a torque of 4 to 6 Nm.

STEP 12



Fill the cooling system with coolant. Open the air vent valve to remove trapped air. Close the valve when coolant appears.

STEP 13



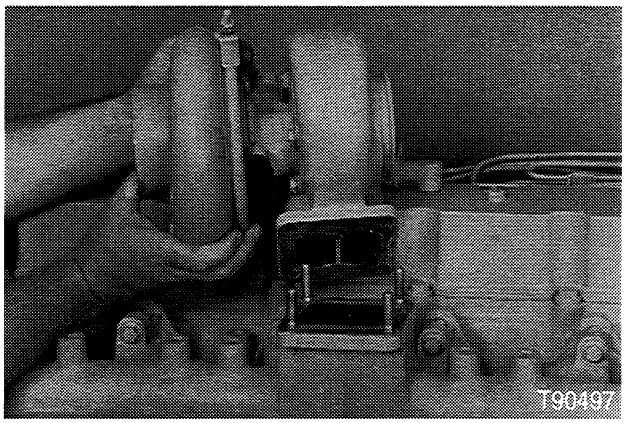
520L94

With the engine running, apply a liquid soap solution to the crossover tube, connections and manifold cover sealing surfaces to find air leaks. The leaks will create bubbles that are easier to detect.

NOTE: The J I Case Company reserves the right to make improvements in design or changes in specifications at any time without incurring any obligation to install them on units previously sold.

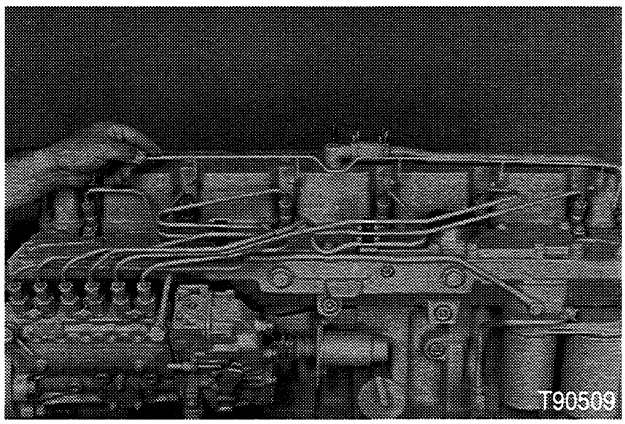
SERVICE THE CYLINDER HEAD AND VALVE TRAIN
Cylinder Head Removal

STEP 1



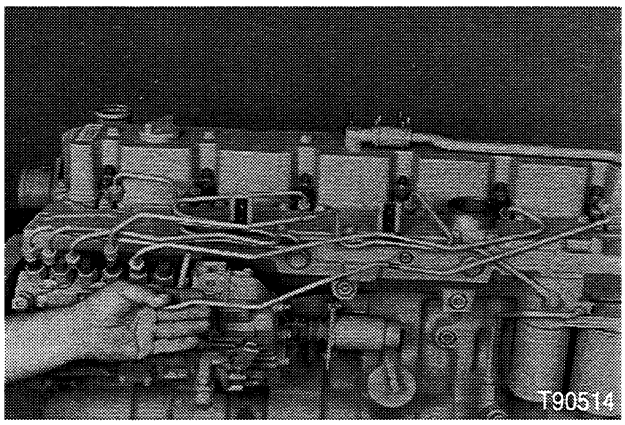
See Section 2465 to remove the turbocharger.

STEP 2



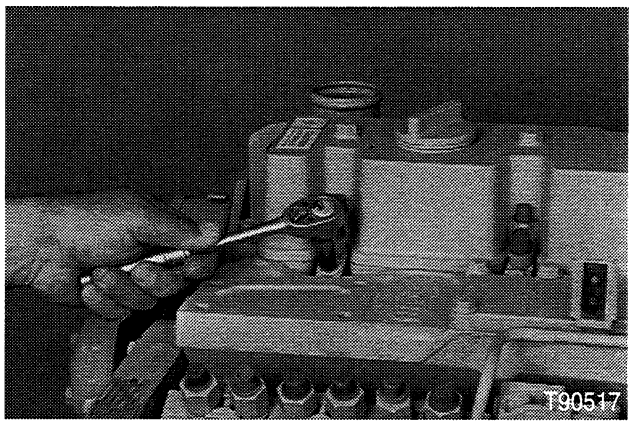
Remove the fittings, gaskets and the leak off line.

STEP 3



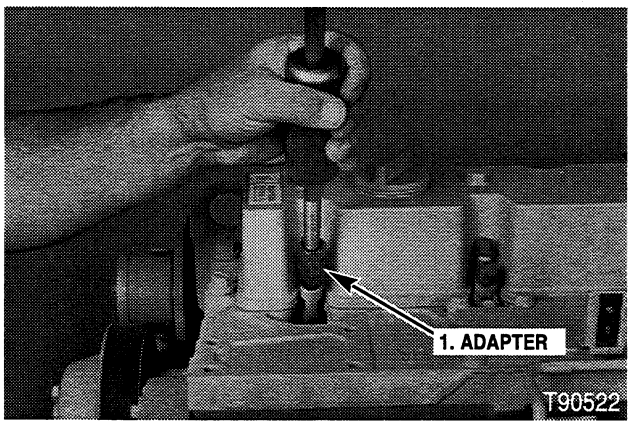
Disconnect the injection lines from the injectors and the injection pump. Remove the injection lines.

STEP 4



Remove the injector retaining bolts and the injector holders.

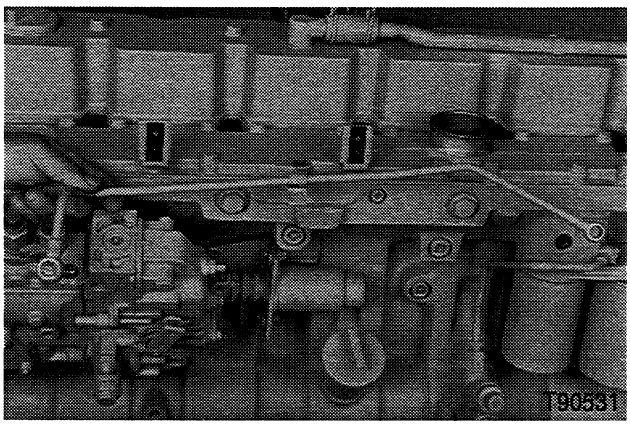
STEP 5



Install the injection puller adapter. Install a slide hammer in the adapter and remove the injector.

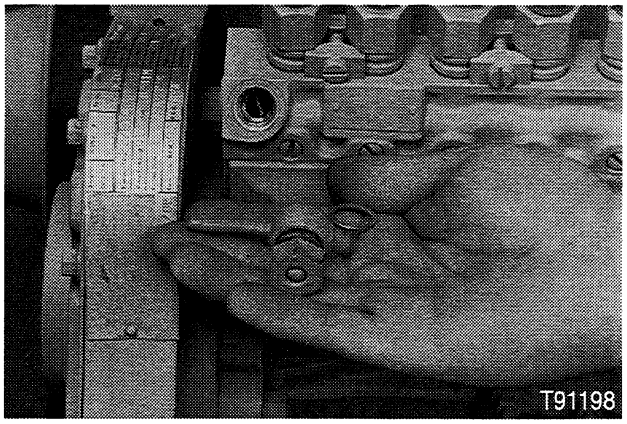
NOTE: *Make sure the injector seal is removed from the cylinder head.*

STEP 6



Remove the fittings and the fuel inlet line.

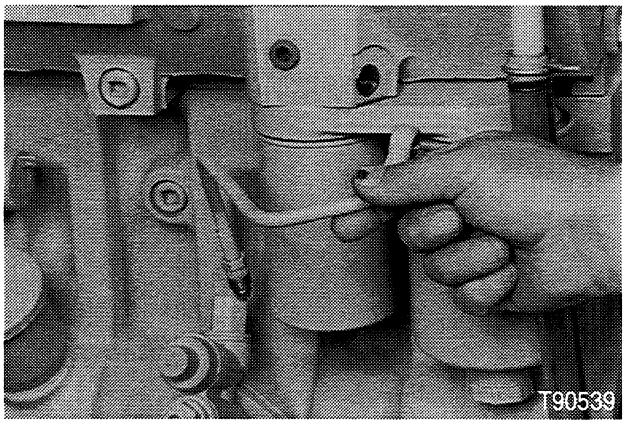
STEP 7



Remove the return line, fitting and gaskets.

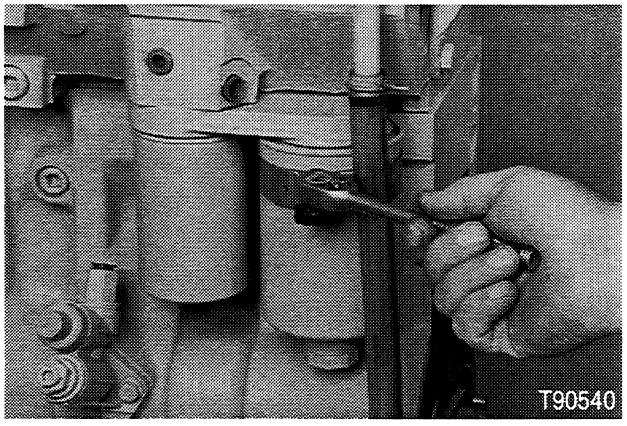
NOTE: *There are two gaskets on the return fitting, one on each side of the return line.*

STEP 8



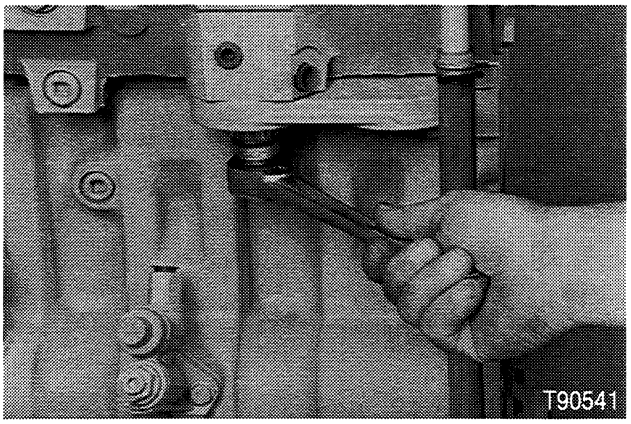
Disconnect and remove the fuel line.

STEP 9



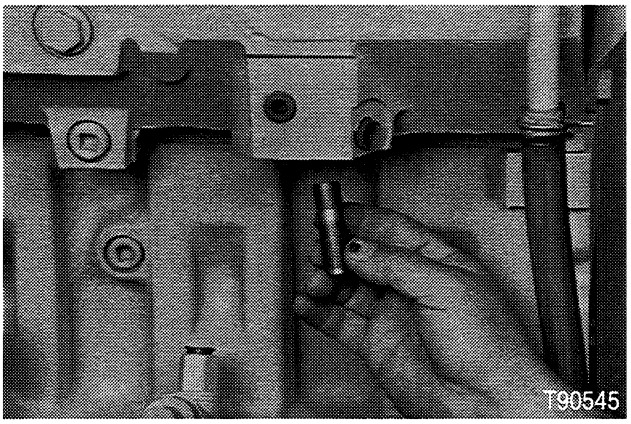
Use a strap wrench to remove the fuel filters.

STEP 10



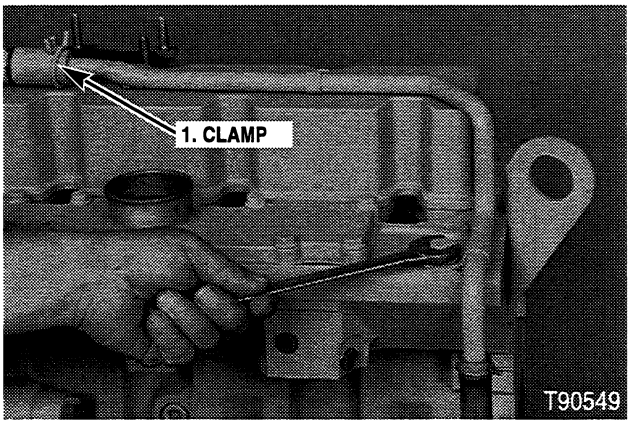
Remove the nut that holds the fuel filter housing and remove the filter housing.

STEP 11



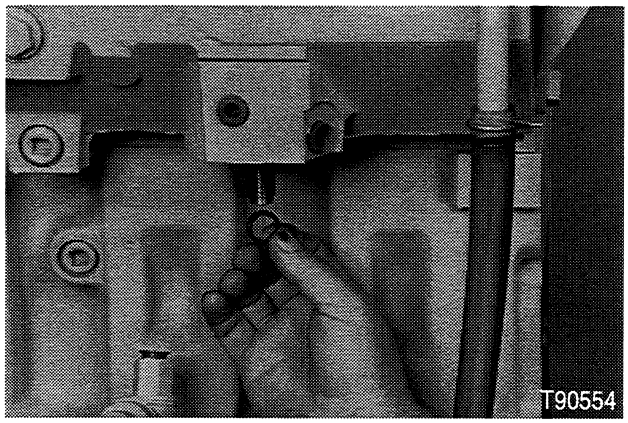
Remove the fuel filter inlet fitting.

STEP 12



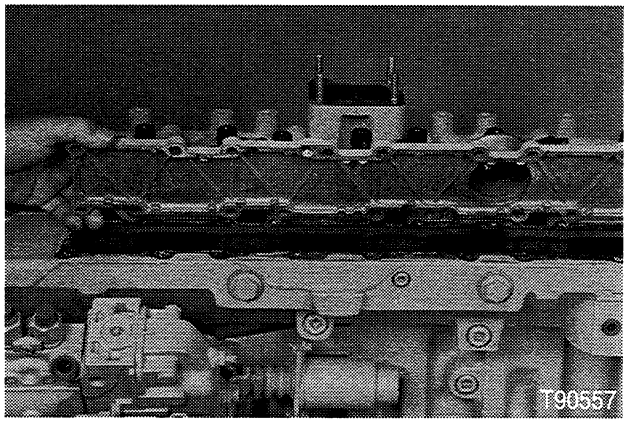
Remove the hose clamp, clamp bolt and the breather tube from the engine.

STEP 13



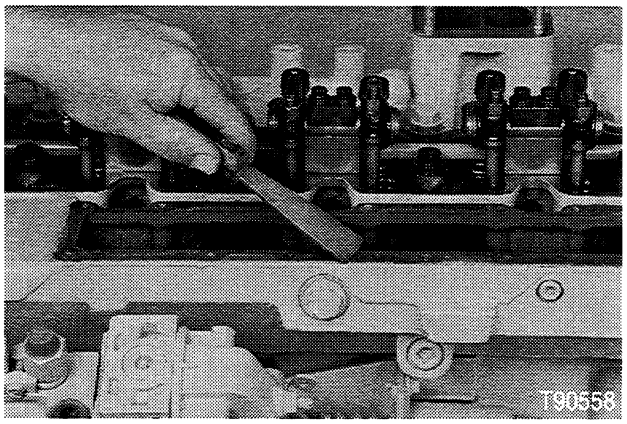
Remove the valve cover bolts and the valve cover.

STEP 14



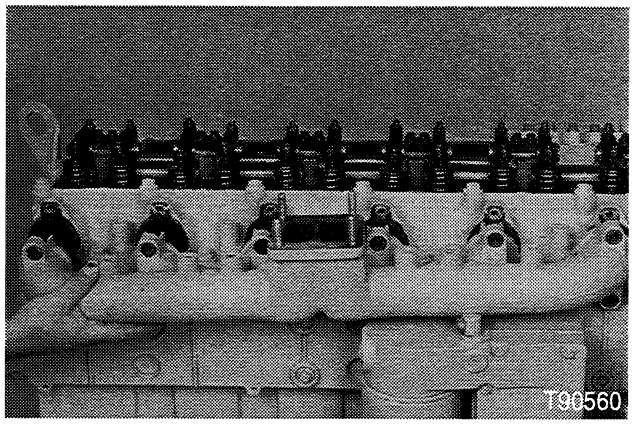
Remove the intake manifold cover bolts and the intake manifold cover.

STEP 15



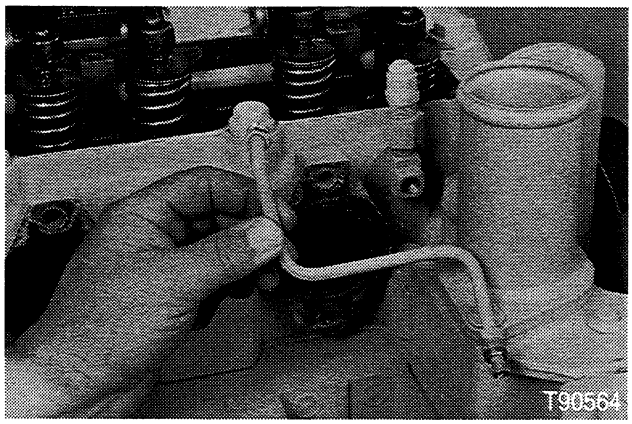
Clean the intake manifold mounting surfaces of all foreign material.

STEP 16



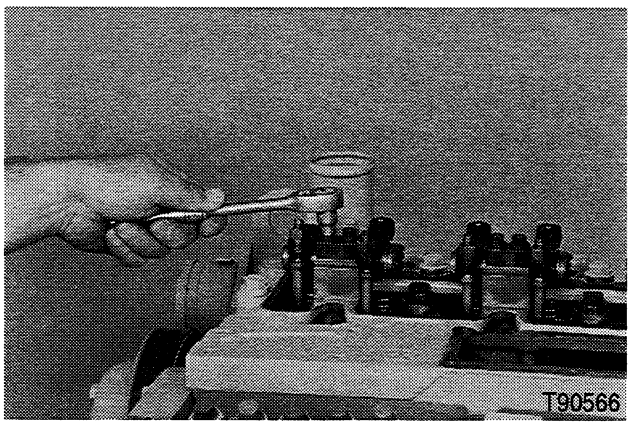
Remove the exhaust manifold bolts and the exhaust manifold.

STEP 17



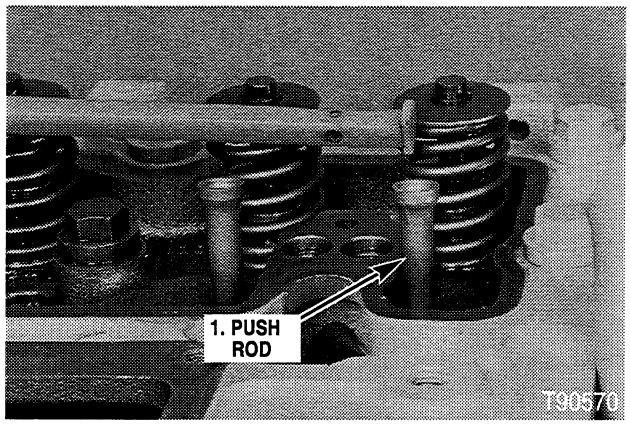
Disconnect and remove the coolant bypass tube.

STEP 18



Remove the rocker arm bolts and the rocker arm assembly.

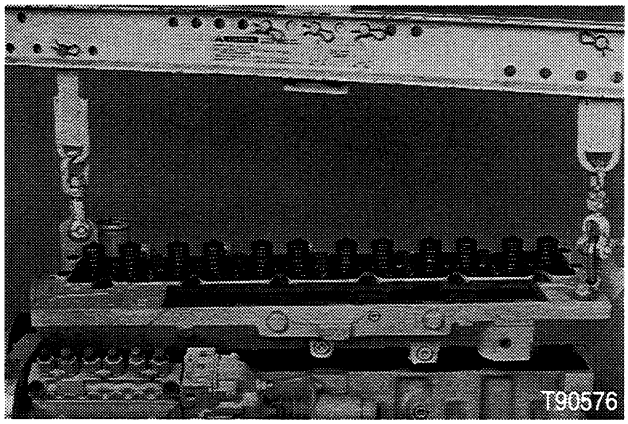
STEP 19



Remove the rocker arm oil supply tube and the push rods.

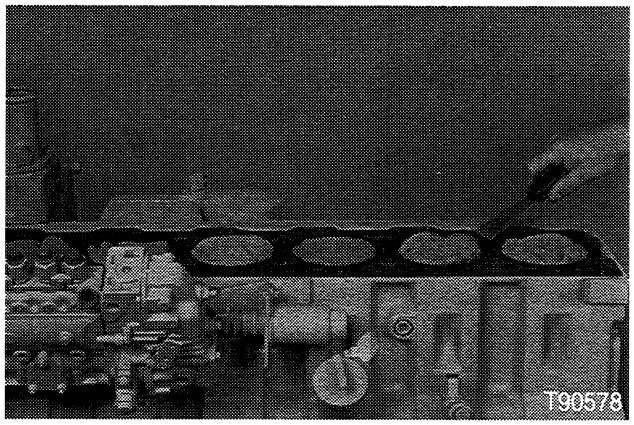
IMPORTANT: *If the rocker arm oil supply tube is made of nylon material the supply tube must be replaced.*

STEP 20



Remove the cylinder head bolts and the cylinder head.

STEP 21

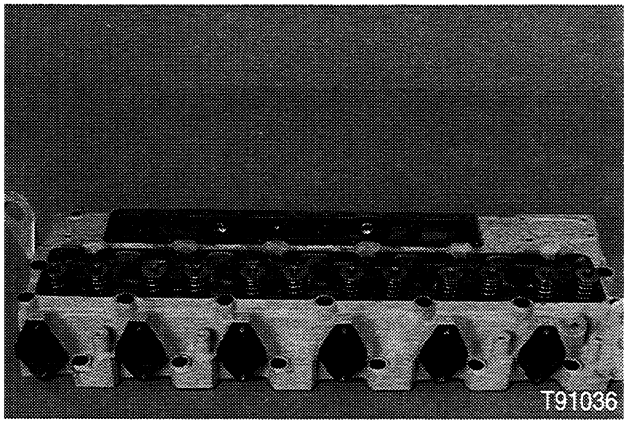


Cover the cylinder bores and pistons. Clean all foreign material from the cylinder head mounting surface.

NOTE: *The cylinders and pistons must be covered to prevent damage to the pistons and cylinder walls.*

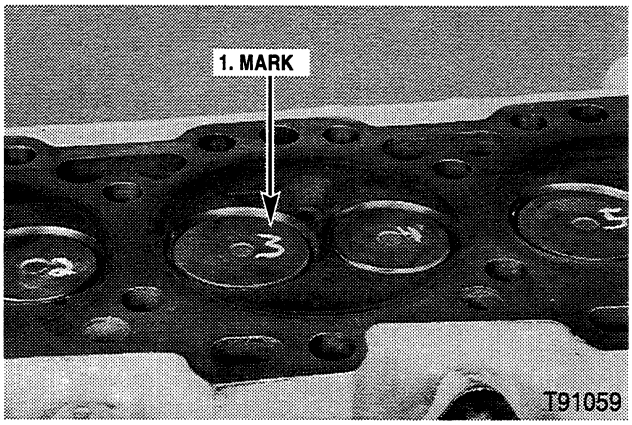
Cylinder Head Disassembly and Inspection

STEP 22



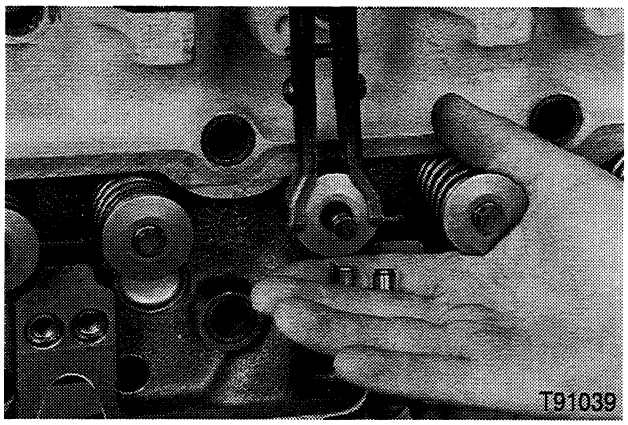
Put the cylinder head on a clean work surface.

STEP 23



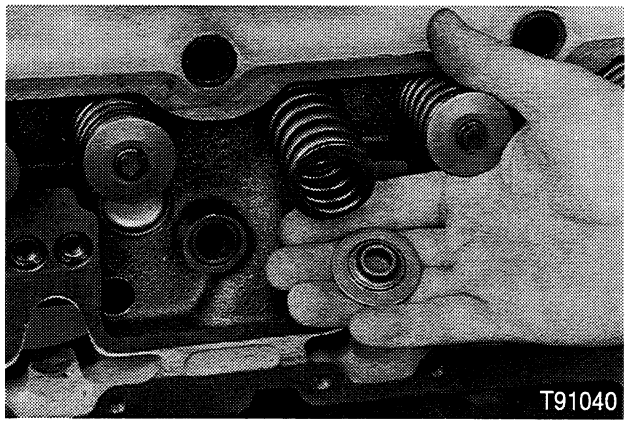
Using paint, make a mark on the valves, keepers and retainers. This will make sure the parts are installed in their original locations.

STEP 24



Push the valve springs down with a valve spring compressor and remove the valve keepers.

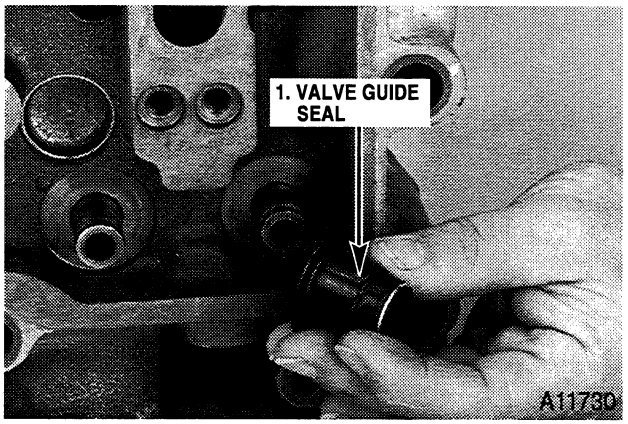
STEP 25



Remove the valve spring retainers and the valve springs.

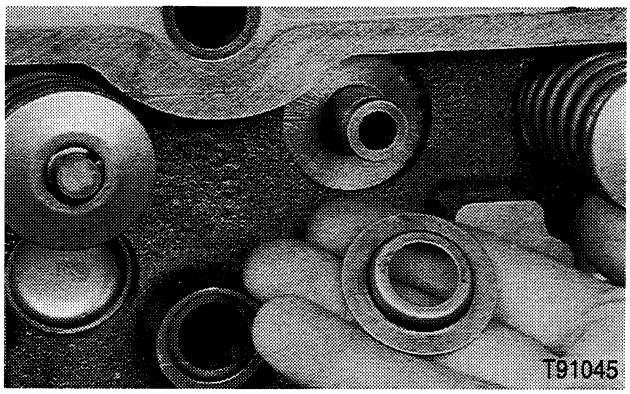
NOTE: *Certain engines are equipped with valve rotators in place of retainers.*

STEP 26



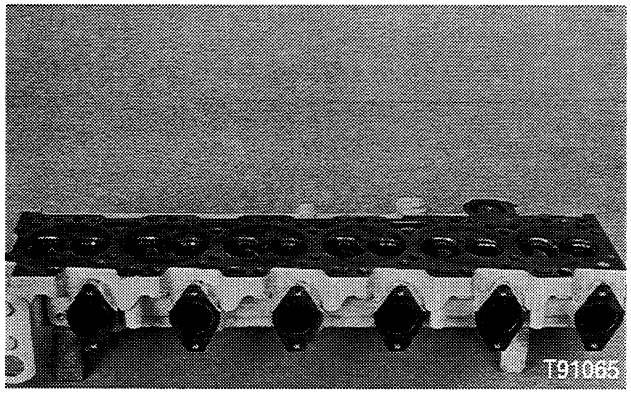
Remove the valve and valve guide seals from the cylinder head. Discard the valve guide seals.

STEP 27



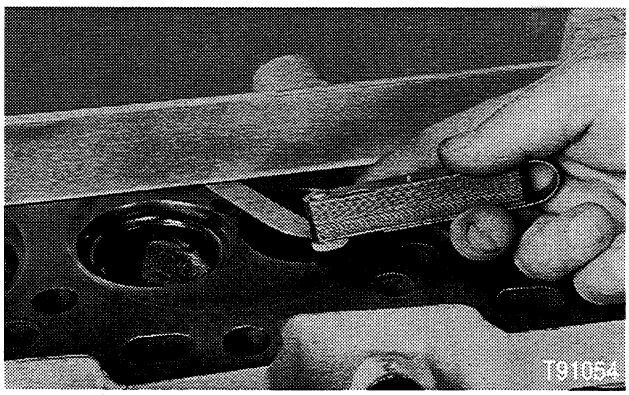
Remove and discard the valve spring seat from the cylinder head (If Equipped).

STEP 28



Clean the cylinder head completely, removing carbon and other deposits. Check for cracks and any sign of damage in the area of the fire ring contact.

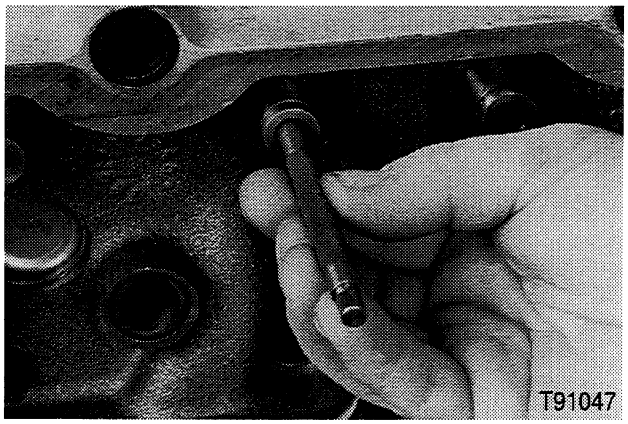
STEP 29

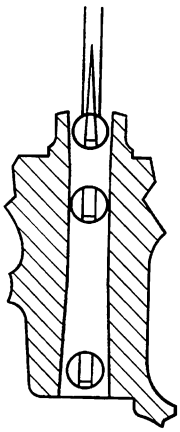


Check the cylinder head surface for warpage. Use a straight edge and feeler gauge. Clean the machined surface of the head. Use a heavy, accurate straight edge to check for warpage at each side and between all cylinders. Also, check for end-to-end warpage in six positions or more.

IMPORTANT: *If the measurement is more than 0.020 mm, the cylinder head must be machined or replaced. Replace the cylinder head if the head height is less than 115.75 mm, after the head is machined.*

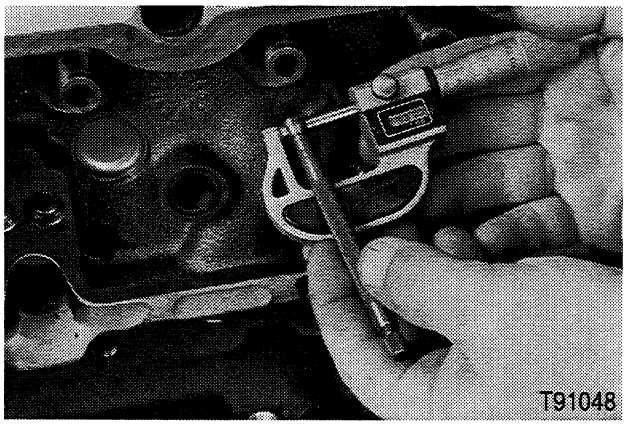
STEP 30





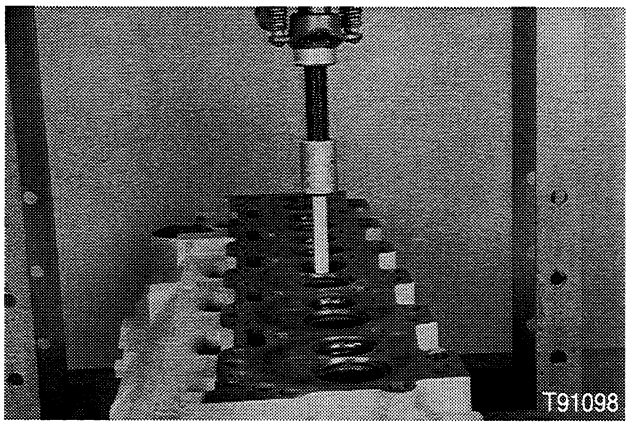
Check the valve guides in three positions with a bore gauge.

STEP 31



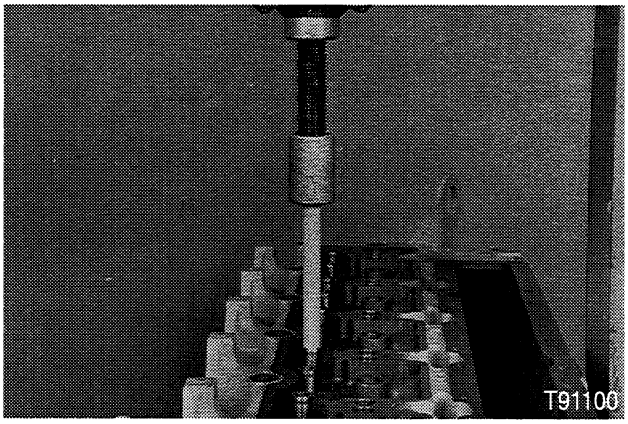
Check the bore gauge with a micrometer. If the diameter is more than 9.559 mm a new valve guide must be installed.

STEP 32



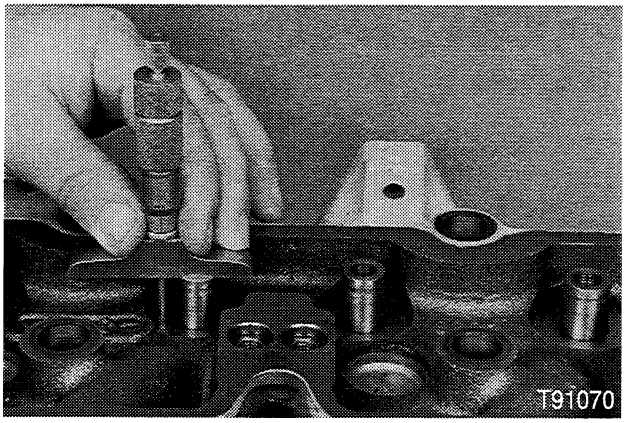
Use the valve guide tool and a hydraulic press to remove the valve guides. Press on the bottom of the valve guides.

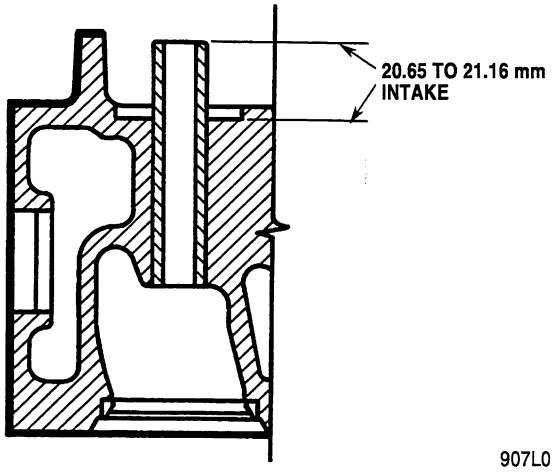
STEP 33



Use the valve guide tool and a hydraulic press to install the valve guides. Press on the top surface of the valve guides.

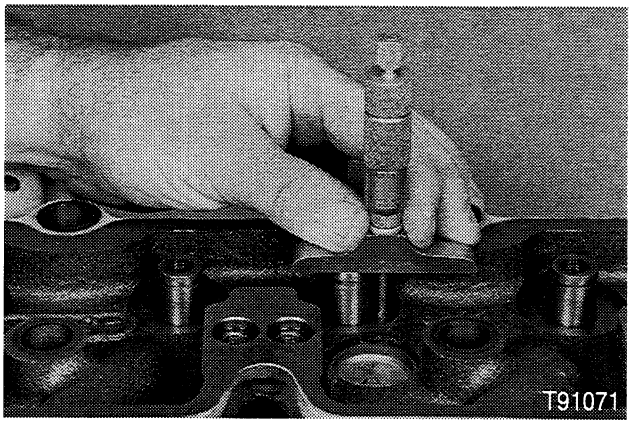
STEP 34

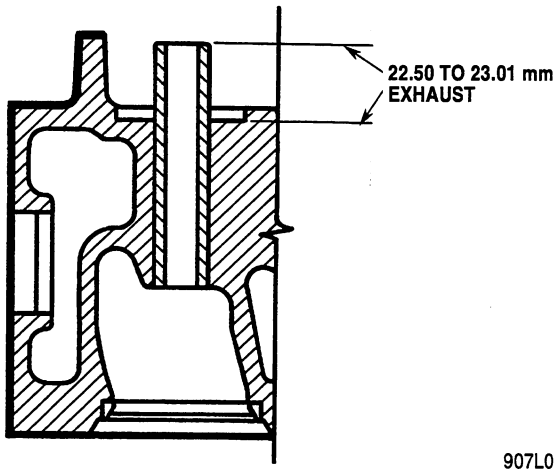




Check the installed height of the intake valve guides. Use a depth micrometer. The distance from the top of the valve guide to the bottom of the recess must be 20.65 to 21.16 mm.

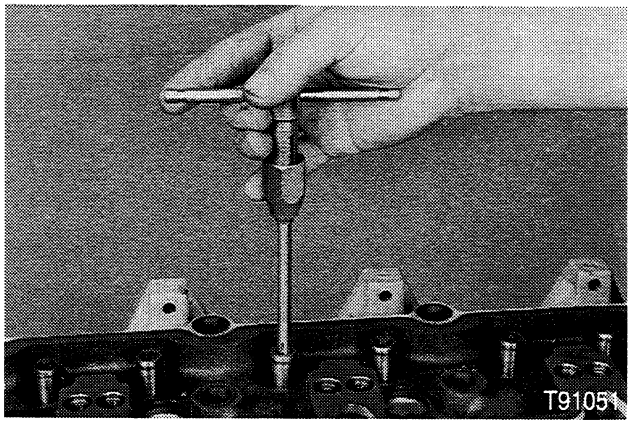
STEP 35





Check the installed height of the exhaust valve guides. Use a depth micrometer. The distance from the top of the valve guide to the bottom of the recess must be 22.50 to 23.01 mm.

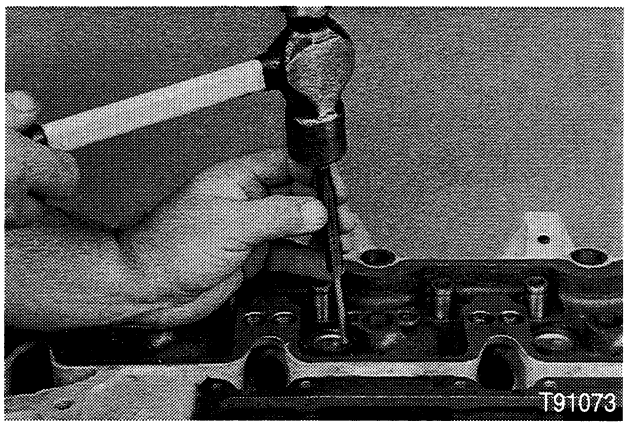
STEP 36



Use an 9 mm drill bit to drill the guides to size. Ream the valve guides to a diameter of 9.539 to 9.559 mm.

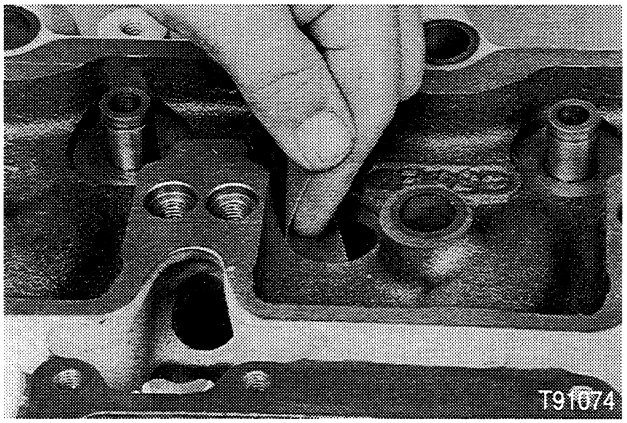
EXPANSION PLUG REMOVAL AND INSTALLATION
18 mm Expansion Plugs

STEP 37



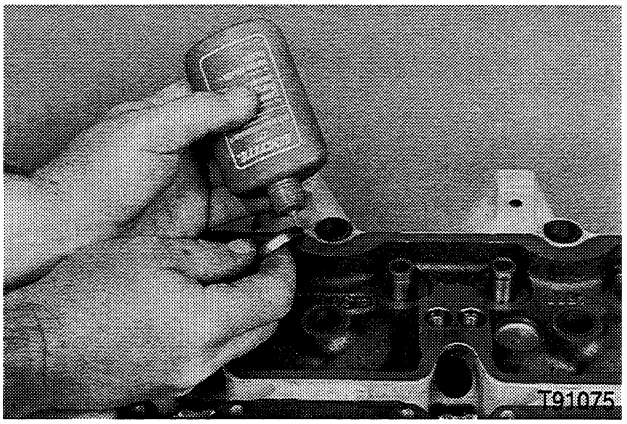
Remove the expansion plug from the cylinder head.

STEP 38



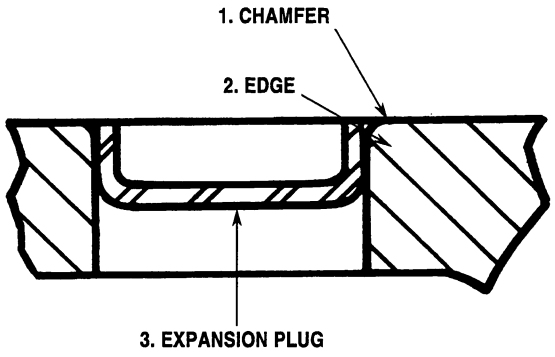
Clean the sealing surface of all foreign material.

STEP 39



Apply Loctite 277 to the sealing surface of the expansion plug.

STEP 40



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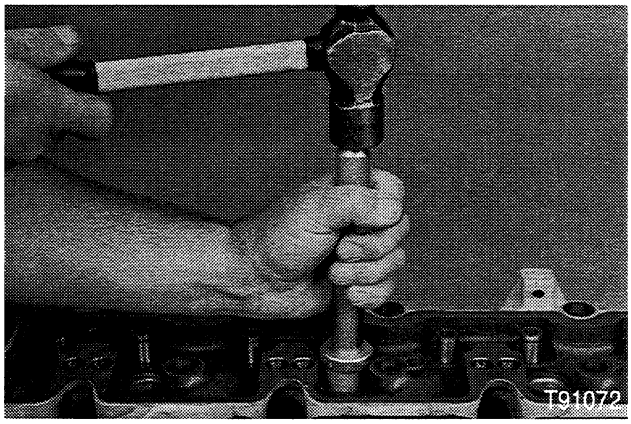
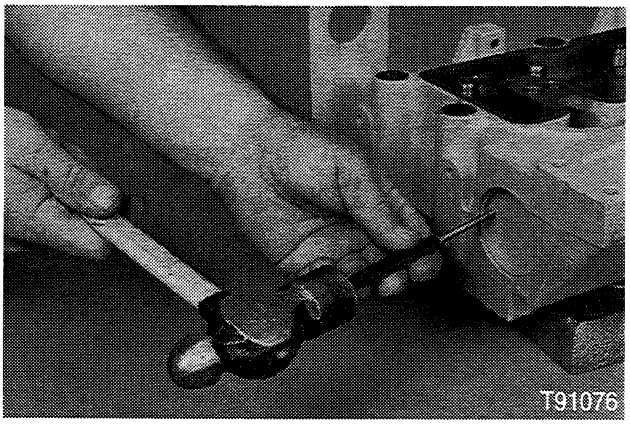


Install the expansion plug into the cylinder head until the top edge of the expansion plug is even with the bottom edge of the chamfer.

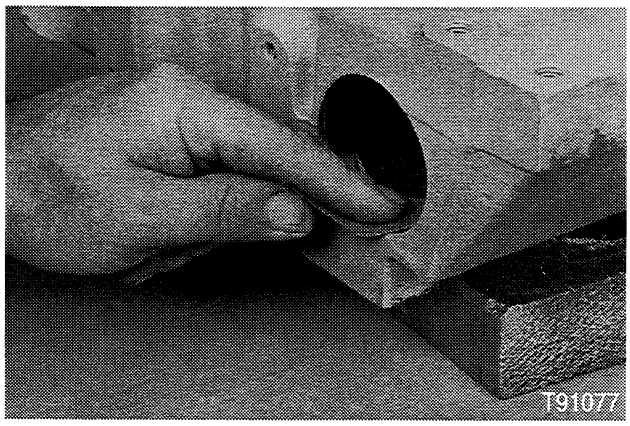
58 mm Expansion Plugs

STEP 41



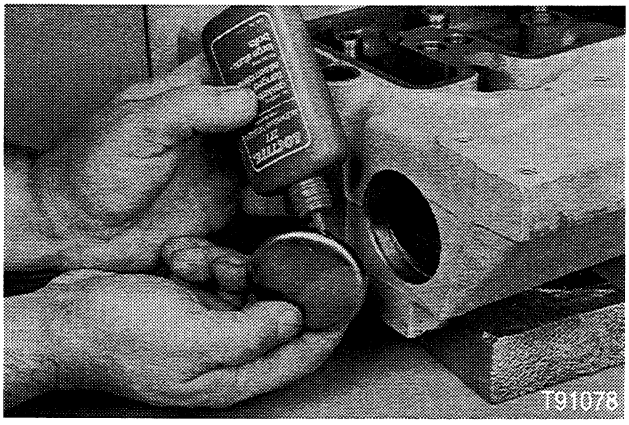
Remove the expansion plug from the cylinder head.

STEP 42



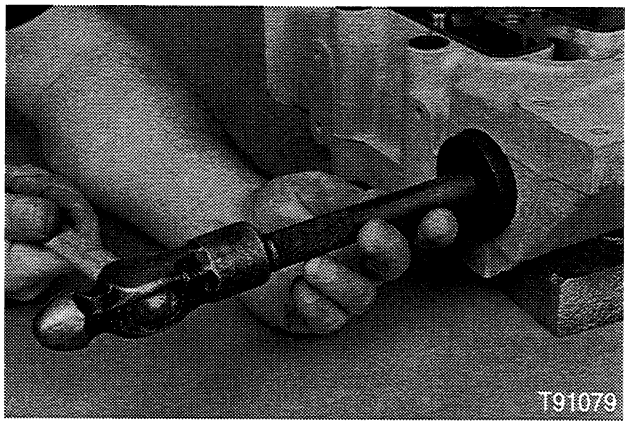
Clean the sealing surface of all foreign material.

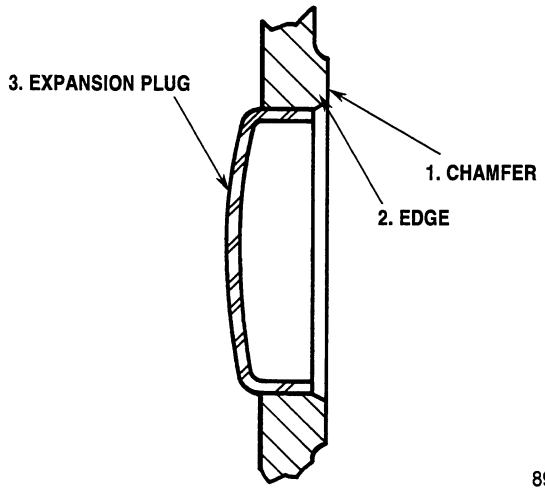
STEP 43



Apply Loctite 277 to the sealing surface of the expansion plug.

STEP 44

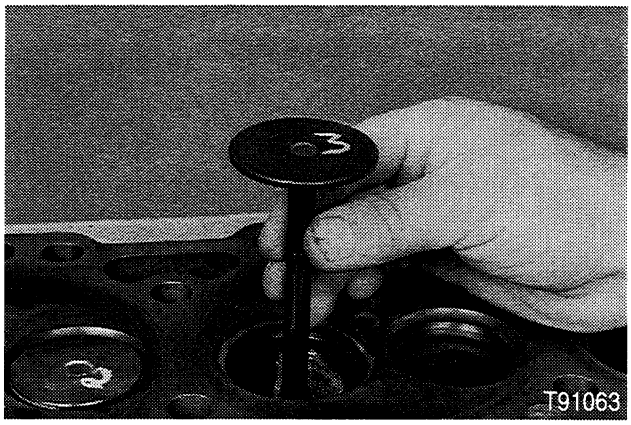




Install the expansion plug into the cylinder head until the top edge of the expansion plug is even with the bottom edge of the chamfer.

INSPECTION OF THE VALVES AND VALVE SEATS

STEP 45

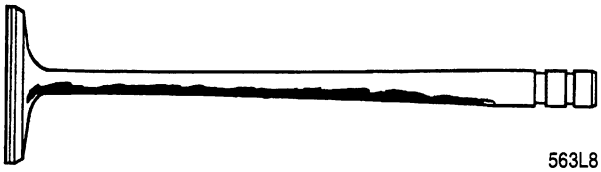


Clean the valves with a power driven wire brush. Do not scratch the valve stems.

STEP 46

Check the valves for the following conditions.

VALVE STEM WITH A NARROW NECK

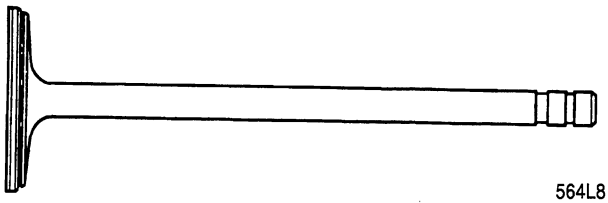


NOTE: REPLACE THE VALVE IF THE CONDITION OCCURS.

This Condition Can be Caused by:

1. Valve does not have lubrication.
2. Restriction in the water passages.
3. Operating the engine under continued overload at too much engine RPM.

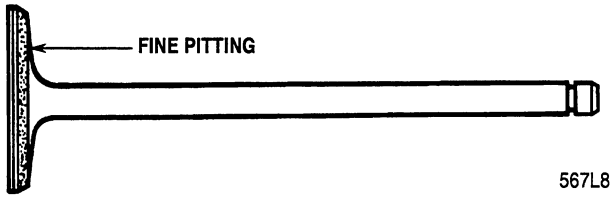
GROOVE IN VALVE FACE



NOTE: GRIND OR REPLACE VALVE IF THIS CONDITION OCCURS.

This condition can be caused by foreign material entering the engine through the intake system or not giving service to the air intake system.

STEP 46(Cont'd)



NOTE: THIS IS A NORMAL CONDITION.

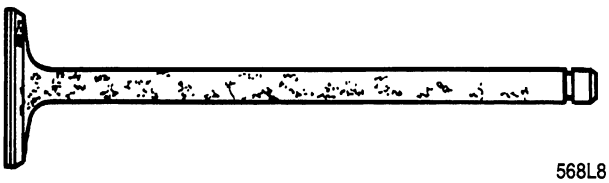
Small amounts of very fine pitting can be found on the surfaces of the valve face or seat after the valves are cleaned. These are normal and will not change the engine performance. This fine pitting is caused by normal oxidation procedure and can occur on any engine during the run-in-period.

HEAVY CARBON AND VARNISH DEPOSITS

NOTE: GRIND OR REPLACE THE VALVE IF THIS CONDITION OCCURS.

This condition is generally caused by worn valve guides or bad seals on the valves, permitting oil to go by the valves. Low operating temperature is a secondary cause. Worn piston rings and cylinder walls will also permit too much oil to reach the combustion chamber.

RUST OR PITTING ON VALVE STEM

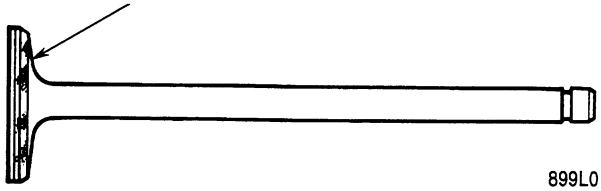


NOTE: REPLACE VALVE IF THIS CONDITION OCCURS.

This condition can be caused by using bad quality engine oil or fuel and by not correctly keeping the engine in storage.

STEP 46(Cont'd)

RUST OR PITTING IN VALVE FACE



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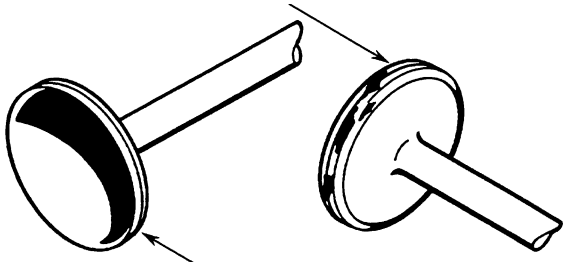
NOTE: THIS CONDITION CAN BE CAUSED BY USING BAD QUALITY ENGINE OIL OR FUEL.

DEEP BURNED VALVE FACE



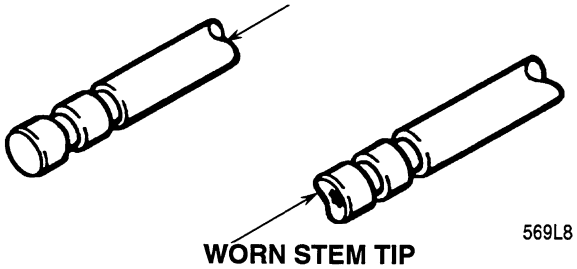
570L8

CONCAVE VALVE HEAD

NOTE: IF EITHER OF THESE CONDITIONS OCCUR, REPLACE THE VALVES.

These conditions are generally caused by running the engine at very high engine temperatures, grinding the valve face too thin or valve grinding that is not correct.

WORN RETAINER GROOVE



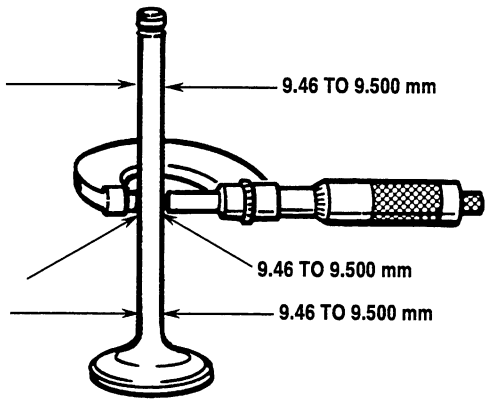
569L8

WORN STEM TIP

NOTE: IF EITHER OF THESE CONDITIONS OCCUR, REPLACE THE VALVE.

STEP 47

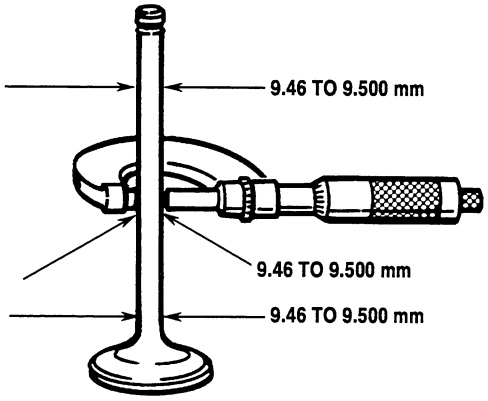
INTAKE VALVES



897L0

Check the intake valve stem diameter at three points along the stem. If the stem diameter is less than 9.46 mm, the valve must be replaced.

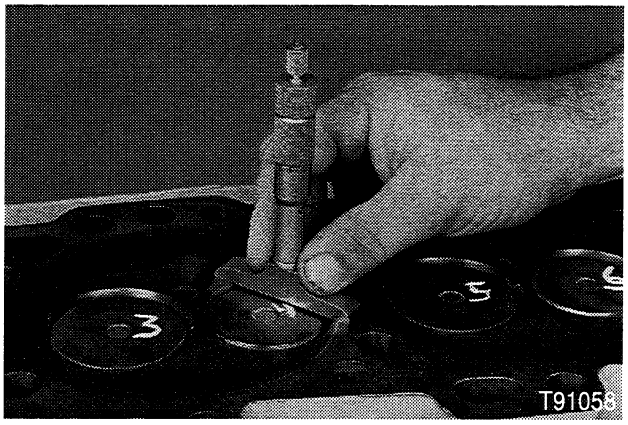
EXHAUST VALVES



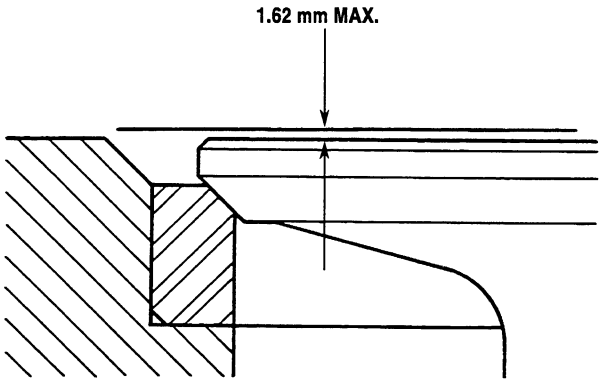
897L0

Check the exhaust valve stem diameter at three points as shown. If the stem diameter is less than 9.46 mm or the stem tip diameter is less than 9.46 mm, the valve must be replaced.

STEP 48

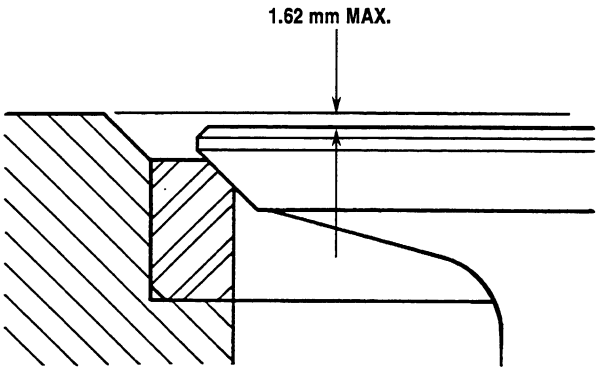


EXHAUST VALVE WITH REPLACEABLE SEATS



894L0

INTAKE VALVES WITH REPLACEABLE SEATS

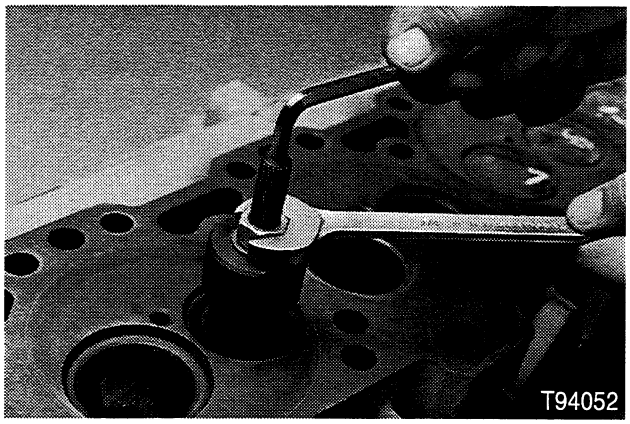


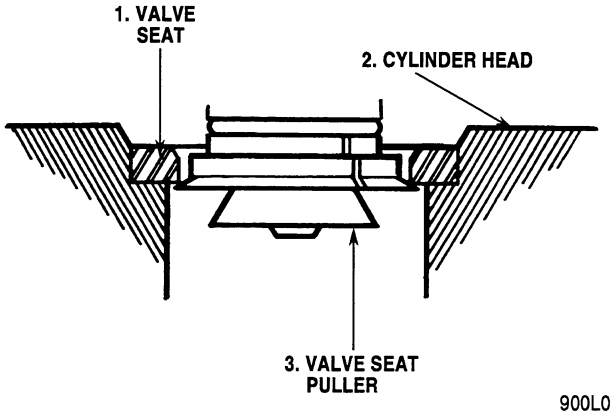
895L0

Put the valves in the cylinder head and check to see if the valve heads are recessed in the cylinder head. If the valve head is recessed more than 1.62 mm below the cylinder head surface, the valve must be replaced or a valve insert must be installed to make sure that there is equal compression ratios between cylinders.

VALVE SEAT REMOVAL AND INSTALLATION

STEP 49

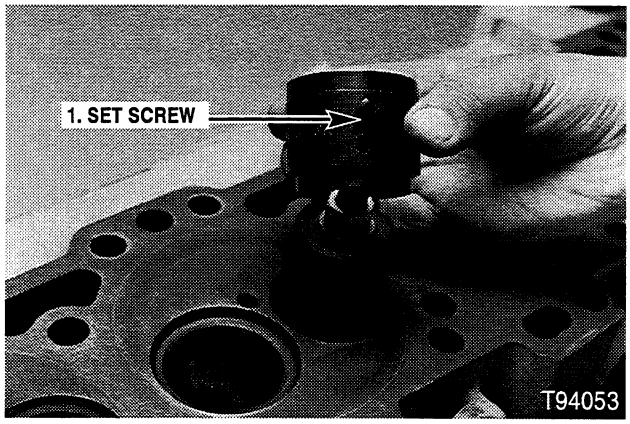




Put the valve seat puller into the valve cavity and tighten the adjusting nut so that the puller is located against the bottom of the valve seat.

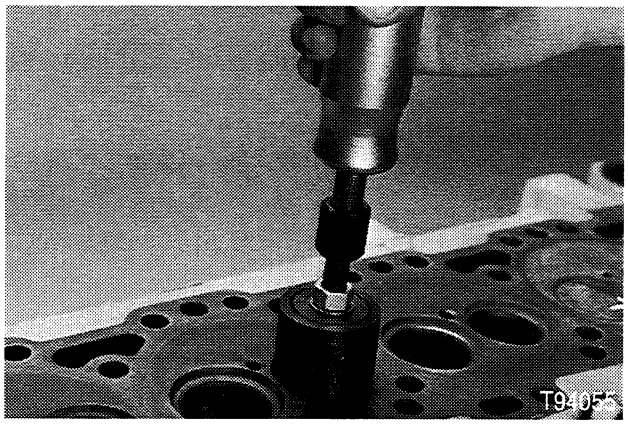
NOTE: *Never try to remove the valve seats with a center punch, cold chisel, prybar, etc.*

STEP 50



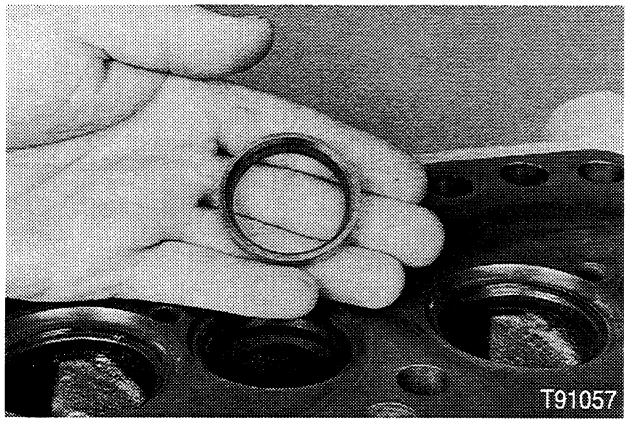
Slide the collar over the valve seat puller and tighten the set screw. Place the small OD end of the collar against the valve seat when removing the exhaust valve seat and place the large OD end of the collar when removing the intake valve seat.

STEP 51



Install the adapter nut and puller on the valve seat puller and remove the valve seat.

STEP 52



Clean the recessed area in the cylinder head. Put new valve seats in dry ice to shrink the valve seats for easy installation. Use a driver and install the valve seats.

Suggest:

If the above button click is invalid.

Please download this document

first, and then click the above link

to download the complete manual.

Thank you so much for reading

REFACING INTAKE VALVES, EXHAUST VALVES AND VALVE SEATS

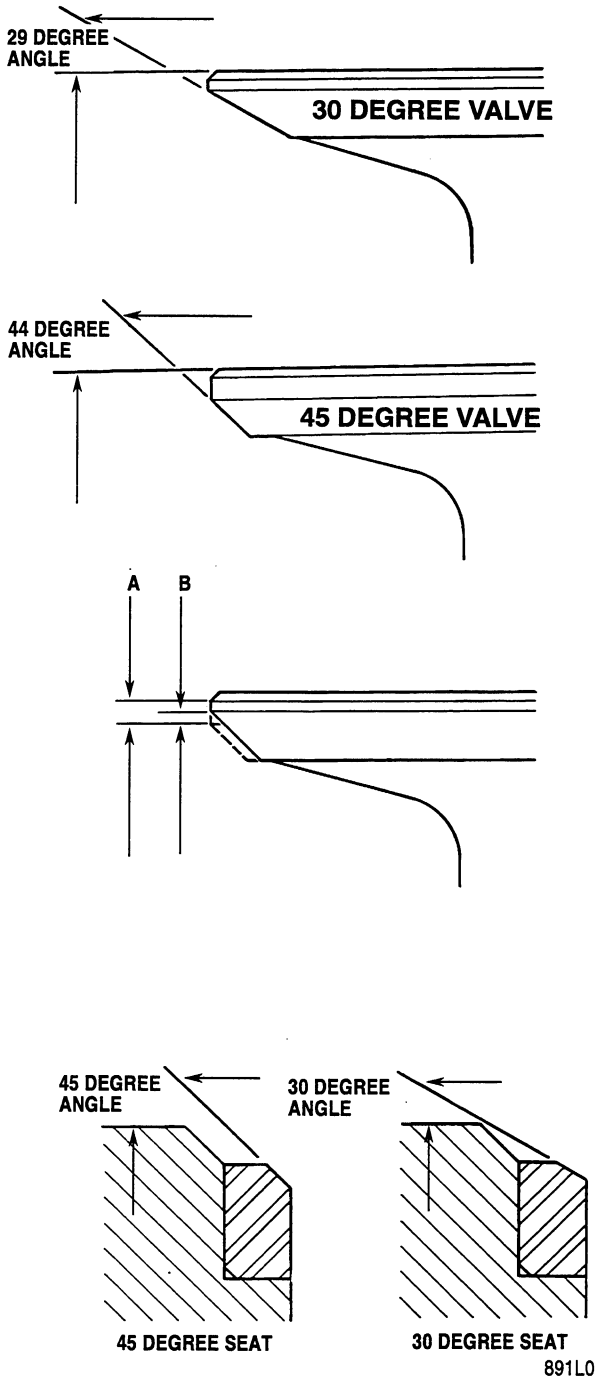
STEP 53

The 45 degree exhaust valves are smaller in diameter than the intake valves.

The 30 degree intake valves are larger in diameter than the exhaust valves.

STEP 54

VALVE AND SEAT GRINDING ANGLES



If dimension A and B is less than 1.5 mm, the valve must be replaced.

NOTE: *Use a precision seat grinder. Take very light cuts with the grinding stones so just enough metal is removed, to end up with a good smooth seat finish.*