REPLACING THE STOCK 35 PSI EXHAUST VALVE SPRINGS WITH
H.D. 60 PSI EXHAUST VALVE SPRINGS IN A 12 VALVE 5.9L CUMMINS

THIS PROCEDURE SHOULD BE CARRIED OUT BY A CERTIFIED DIESEL MECHANIC

NOTES: Please read this entire instruction sheet over very carefully before attempting to complete this procedure.

Removal of the cylinder head or injectors is NOT required if this procedure is followed correctly.

The following specifications such as torque value, cylinder pairings, exhaust valve lash/setting, have be derived and compiled from the "Cummins Shop Manual for B Series Engines" Bulletin #3810206-02.

The following is to be used as a guide only. Wear safety glasses throughout the entire installation.

Cummins B series engines allows the replacement of two exhaust valve springs on two cylinders without rotating the crankshaft, therefore it is very important that the engine be at absolute TDC. Remember that #1 & #6 are at TDC as a pair, #2 & #5 are at TDC as a pair and #3 & #4 are at TDC as pair.

TOOLS REQUIRED:

KD 2078 or Balkamp 7769189 Valve Spring Compressor, or equivalent
2 Torque Wrenches: 1 accurate at 18 ft-lbs and 1 accurate at 100 ft-lbs
Sockets: 13mm, 18mm, $7/8$" shallow, $15/16$" shallow, $1/2$" drive
$1/2$" Drive Ratchet
Pencil magnet
$9/16$" Combination Wrench
Screwdriver: Short Flat Blade
.010" & .020" Feeler Gauges
Rubber Mallet
Safety Glasses

REPLACEMENT PROCESS

1   Clean the area around your valve covers, and then remove valve covers.

2   Place the $7/8$" shallow socket on the alternator nut (a few alternators take a $15/16$" shallow), with the $1/2$" drive ratchet in the reverse direction. Insert it into the $7/8$" socket to rotate the engine. The engine will easily rotate in a backwards direction only. Rotate the engine, in a backwards direction, carefully watching the rocker arms and valve motion. You are looking for #1 intake valve to be on its way up (valve closing). Once the # 1 intake valve is closed the engine is very close to TDC, watch the #1 exhaust valve. As soon as the exhaust valve starts to move down (exhaust valve opening) the slightest bit STOP, that means this cylinder is at TDC and its pair #6 is also at TDC. This can checked by feeling the rockers on the other cylinder (#6) they should both be loose.

NOTE: The exhaust valve will be the one inline with the exhaust port on the exhaust manifold and under the longer rocker arm.

3   **REMOVAL OF THE ROCKER ARM AND PEDESTAL ASSEMBLY FOR #1 CYLINDER**

Using the 13mm socket, remove the smaller capscrew first. Then, using the 18mm socket remove the larger capscrew. Use your thumb and forefinger to hold the push rods in place as you lift the rocker arm pedestal off.

Now, use the valve spring compressor to remove the exhaust valve spring on that cylinder. TDC can be confirmed once the spring is compressed but not removed, as the keepers will stick inside the rotocoil allowing the exhaust valve to rest on the top of the piston. Once TDC is confirmed, a light tap on the end of the valve spring compressor will break the keepers free from the rotocoil.

Use a magnet to remove the keepers from the rotocoil, then remove the spring. Remove the stock valve spring from the compressor and replace it with the new Heavy Duty 60 PSI spring. Install the new exhaust valve spring, reusing the original keepers. Lightly tap the end of the valve stem with a mallet to verify the keepers are seated. DO NOT stand inline with the valve stem when tapping the valve with the mallet.

Check that the bottom end of each push tube is seated in the cup of the cam follower. Install the rocker arm pedestal making sure both the push rod cups are located in the ends of the adjusting screw. Gradually tighten both rocker pedestal capscrews until snug. Using the 18mm socket torque first to 29 ft-lbs, second to 62 ft-lbs and finally to 93 ft-lbs. Then, using the 13mm socket torque to 18 ft-lbs.

Repeat step 3 on #6 cylinder exhaust valve spring.

A trick that makes installing the H.D. spring a little easier, before installing the H.D. valve spring into the compressor make sure the screw is backed all the way out, then when inserting the H.D. spring into the compressor rotate it into the tool to put some preload on the spring before tightening the screw, that will add more clearance to install the keepers.

4   Rotate the engine watching the intake valve closing for #5 cylinder as done in step 2 for #1 cylinder. As soon as #5 exhaust valve starts to open STOP, this is TDC.

Repeat step 3 on #5 and # 2 cylinders. Once these two cylinders are complete repeat step 2 and step 3 on #3 and #4 cylinders.

Once all 6 cylinders exhaust valve springs have been replaced and all the rocker pedestals are torqued to specifications proceed to step 5.

5   Adjustment of valve clearance, always done cold, .010" intake, .020" exhaust. Rotate the engine over until #1 cylinder is on compression stroke, watch the intake valve on #6 cylinder, as intake comes up and exhaust JUST starts to move down STOP, you are now on exhaust stroke of #6 and compression stroke #1.

6   Adjust the intake valve clearance to .010" and the exhaust valve clearance to .020" one the cylinders which are marked with the "X" in the chart below.

7 Using a paint pen, mark the harmonic dampner position to the timing cover. Rotate the crankshaft 360° (degrees).

8 From this position both intake and exhaust valves on #1 cylinder will be tight and both valves on #6 cylinder will be loose. Set the remaining valve clearances that are marked with the "@" symbol. Double check all fasteners for correct torque.

9 Reinstall the valve covers and any other items removed to gain access to the valve covers.

Cylinder #			Step 5	Step 7
6	Exhaust			@
	Intake			@
5	Exhaust		x	
	Intake			@
4	Exhaust			@
	Intake		x	
3	Exhaust		x	
	Intake			@
2	Exhaust			@
	Intake		x	
1	Exhaust		x	
	Intake		x	