LOWE Valve Spring Setting Procedure: 101022

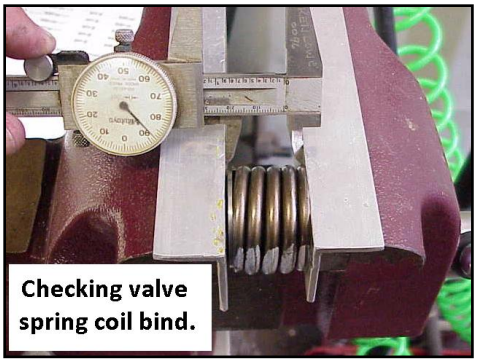
Log the information on the chart - Cylinder head set, date and cam info.

1. **Disassemble and clean cylinder heads.**

2. **Lap the valves if necessary.**

3. **Now look for the Total Valve Lift information (abbreviation is TVL).**
   If this is a camshaft used in the past use the information from that sheet. If it is a new setup find the total valve lift on the camshaft and log this in the chart. Multiply this by the rocker ratio and get the "TVL". Post this to the valve spring chart.

4. **Verify the coil bind dimension. Press valve spring in a vise and measure.**
   Note: Compress all new springs to remove the initial "loss". Add the .030 to the coil bind dimension for the "CBD" height. Example if the spring measures 1.350" add .030" and the CBD is 1.380"
   Log this in the chart in "CBD".

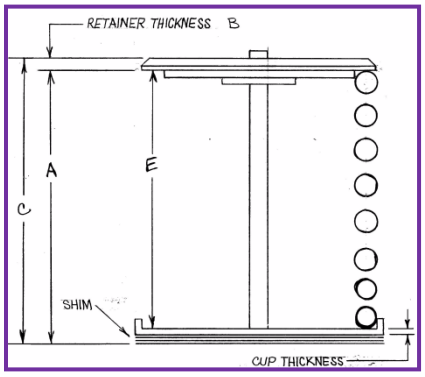

Checking valve spring coil bind.

5. **Add the total valve lift "TVL" to the "CBD" dimension to find the <u>minimum</u> installed high "MIH" dimension.**
   "CBD"+"TVL" = "MIH" (<u>minimum</u> installed height) this number is an *<u>absolute minimum</u>*** that the spring can be installed at or valve train damage will result.**

6. **Measure the retainers for the "B" dimension. Log this on the chart.**

7. **Measure the cups for the "F" dimension. Also called CUP. Log this on the chart.**

8. **To get the "A" dimension use a height mike and install the valves with retainers and keepers only. Measure each valve and retainer assembly logging the information on the spring chart in the "A" window. See photo >>> (Bottom of retainer to cylinder head)**



9. **To find the "C" dimension add the "A" dimension and the "B" dimension and put the information in the "C" window. "A" + "B" = "C"**

10. To determine what the maximum amount of shim possible in this application, in the space available, with the spring that is used in this application do the following process.

11. Start with the "A" number and subtract the "MIH" number and this is the maximum amount of shim, that can be used with this spring, on this head, in this position.

12. Put this information in the row marked "MAX Shim"

13. Now you need to find the "*calibration setting"* for all the intake valves and all the exhaust valves.

- **A. First do the intake valves. Find the *BIGGEST* "C" dimension for the intake group. Circle the position at the top of the column. Do this for the exhaust valves as well.**
- **B. Take that biggest "C" dimension and subtract the lesser "C" dimension of the intake group from the biggest "C" dimension in this group.**
- **C. Put this number in the "*calibration section"* window for each respective intake valve as a + (plus) number.**

Example if the largest "A" is 1.920 and you see 1.915 then the calibration section would read .005, this means that the spring tester dial must read +.005 more than the zero you set it to.

Repeat the procedure for the exhaust group.

Record this calibration data on the bottom of the head sheets and mark (circle) the ZERO calibration information for both intake and exhaust springs.

14. Setting the calibration on the spring tester.

- **a. At the bottom of the head chart will be the "calibration" numbers for each set of valves, both intake and exhaust which will probably be different "calibration" numbers.**
- **b. Set a dial vernier or a Hite Mike to this number and place it in the spring tester.**
- **c. Loosen the lock screw on the left and adjust the bolt, that the dial gauge on the spring tester presses against to where the both the little and the big dial needle are pointing to the 6 o'clock position on the dial face. Move the dial to where the big needle points to ZERO. Now lock the adjusting bolt in place with the lock screw on the side.**

Now you have set the spring tester at zero. All spring dimensions will be this number or more as indicated by the +(plus) "calibration" numbers on the head chart

Note: Do all the intake valves. Always check intake valves first.

Note: Tired intake springs may be used on exhaust.
(less pressure, less installed height)

After doing the intake springs, repeat the set up for the exhaust valves by re-calibrating the spring tester to ZERO for that set of valves.

15. Now once the spring checker has been calibrated to the ZERO numbers for each set of springs (Intake and Exhaust) you will be ready to start checking and setting springs.

PROCESS of CHECKING and SETTING THE SPRINGS

16. To check the springs using the spring pressure checker once the spring checker has been calibrated to ZERO for the intake valve spring set start with spring number 1 or a new spring. If this spring is not the calibration standard of ZERO then add the calibration amount to the checker as per each spring/valve combination.
17. Put the valve spring WITH the valve spring retainer in the valve spring checker and pull the lever to the calibration point and read the pressure. If the pressure is inadequate then shim as necessary to achieve the desired pressure insuring that the "MIH" is not exceeded. Valve train failure WILL occur if the “MIH” is exceeded. A point of caution here is necessary as if the spring is approaching “MIH” and this is between race maintenance it is highly suggested that that spring be replaced with a new or fresher one as the engine will have to go through both quaffing and rounds of racing. If the spring is marginal now it won’t get any better after a couple of rounds of qualifying and then you will have to replace it when you may have other more important things to do.

18. Record data on head sheets as you do each spring.
    *Record total shims used in the “SHIM” row
    *Subtract “SHIM Dimension” from “A” dimension and that information is “IH” / “E” information. It is the “Installed Height” of the valve spring.
    *Subtract the “SHIM Dimension” information from the “MAX Shim” number to get the “STG” or “Shims to Go” number, this is the amount of room you have left before you run out of room for that spring in that position.
    Additional information such as Shims Added give the history of the spring to predict how soon it will fail. Record any shims added at this maintenance period.

19. Keep this information with heads at all times, this information does NOT stay at the workshop as it must travel with the parts along with the on head testing tools and on head valve spring tools and a supply of shims and fresh valve springs.

DIMENSIONS and CODE Information

For each valve subtract from the "A" dimension the
"F" (cup) dimension and the "SHIM" and this dimension is the "IH"(installed height)
"A"-"F"-"Shim"="IH" (installed height) "IH" = "E"

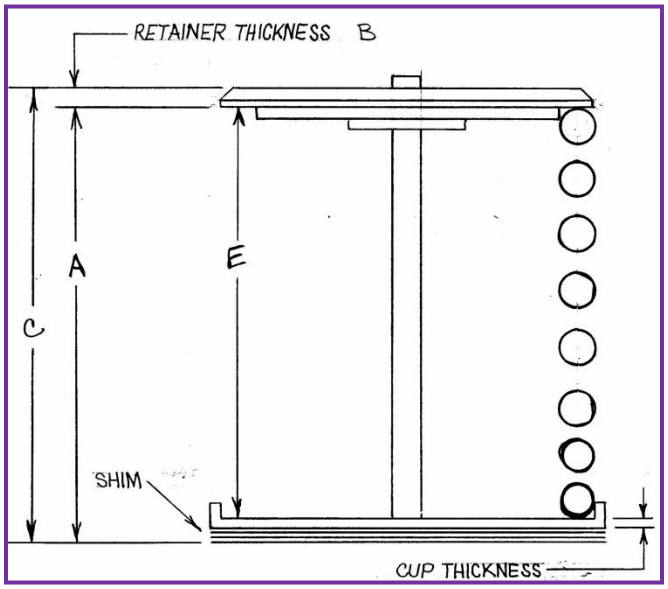
Definitions:

"A" = distance from bottom of retainer (spring side) to the cylinder head.

"B" = retainer thickness

"C" = top of retainer to cyl head surface in valve spring pocket.
"D" = coil bind +.030

"E" = distance from bottom of retainer (spring side) to bottom of spring with valve closed (this is installed height) = "IH"



"F" or "CUP" = cup thickness

"TVL" = total valve lift.

"IH" = Installed height. "IH"="E"

"MIH" = minimum installed height.

"Shim Added" = the amount of shim added at this maintenance period to track the performance of this particular spring to try predict the failure of this spring.

"OHT" = the on head test of the spring pressure from fresh maintenance to be referenced on between round maintenance sessions.

Formulas:

"A" + "B" = "C"
"IH" = "E"
"A" - "CUP" - "Shim" = "IH" (installed height)
"D" + "TVL" = "MIH" (minimum installed height)