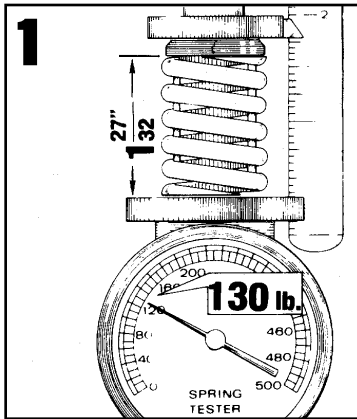


For more information, see www.cranecams.com

ALWAYS WEAR SAFETY GLASSES OR EYE PROTECTION WHEN OPERATING POWER TOOLS.

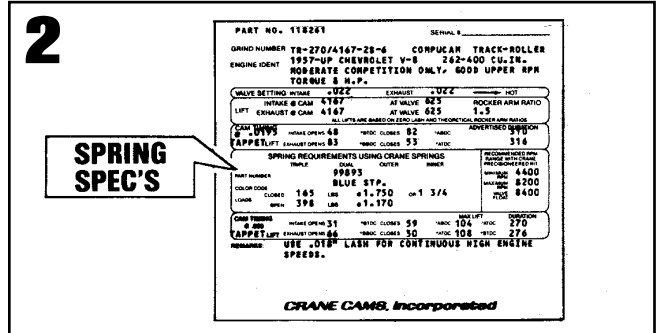
CHECKING VALVE SPRING PRESSURE

- To properly check the valve spring pressure of our valve springs against either the specifications on our cam spec card, in our valve spring box, or both, the proper Crane valve spring retainer must be used and the valve spring installed height must be measured as shown in Figure 1. The pressure observed at this installed height is the seat pressure. Plus or minus ten (10) pounds at this height is acceptable for new valve springs; minus fifteen (15) pounds at this height is acceptable for used valve springs.



OBTAIN THE CORRECT SPECIFICATIONS FOR YOUR APPLICATION

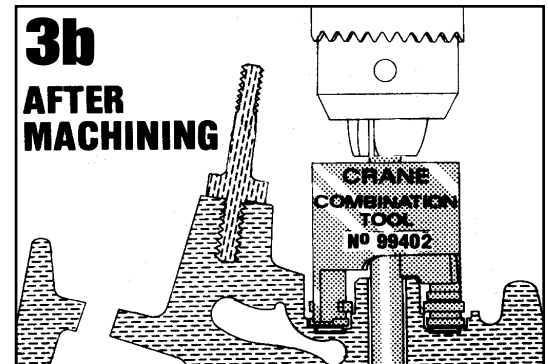
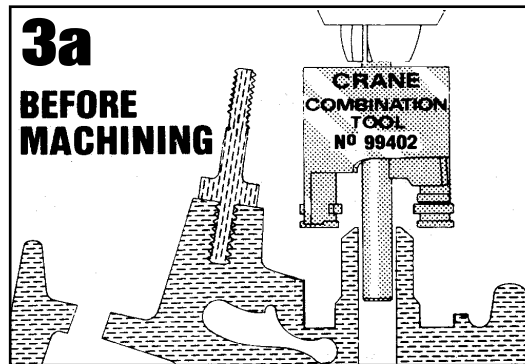
- Your Crane cam spec card should be consulted for the correct installed height dimension and valve spring pressure (See Figure 2). This is important because the cam card lists the best available valve spring combination and installed height for the particular cam grind and average application. This specified pressure will assure proper cam and lifter



break in and long cam lobe life. Under extreme high RPM requirements this pressure may be increased 10% to 15% but only after the cam and lifters are broken in. If the cam spec card is not available, consult our catalog or contact our performance consultant staff directly.

CYLINDER HEAD MACHINING FOR DUAL AND TRIPLE VALVE SPRINGS

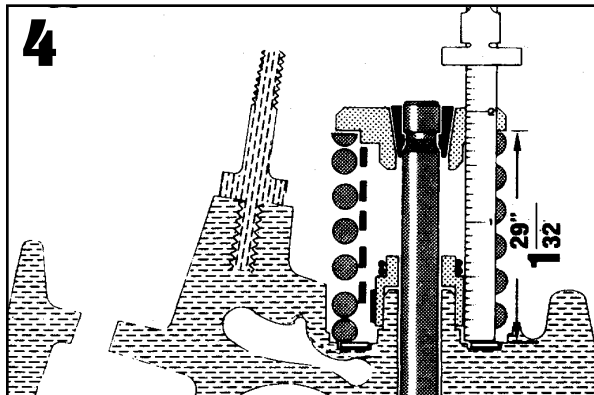
- For maximum performance and reliability, we often use larger than stock diameter valve springs. On most engines it is necessary to machine the cylinder head to accept the new springs, retainers and seals. You should use the recommended tool(s) specified in the catalog to properly prepare the head, following the instructions included with the tool. Figures 3a and 3b show the proper use of a combination tool on a small block Chevrolet head.



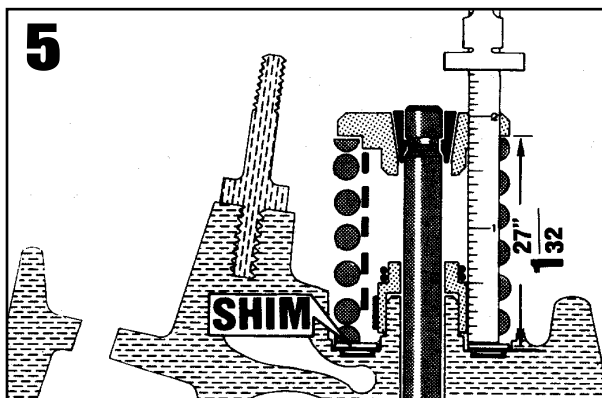
CRANE CAMS, INC. 530 Fentress Blvd., Daytona Beach, FL 32114
www.cranecams.com Tech Line: (386) 258-6174 Fax: (386) 258-6167

OBTAINING CORRECT ASSEMBLY HEIGHT

4. After determining the correct installed height dimension (this dimension is on your cam spec card), the available installed height must be measured as shown in Figure 4.

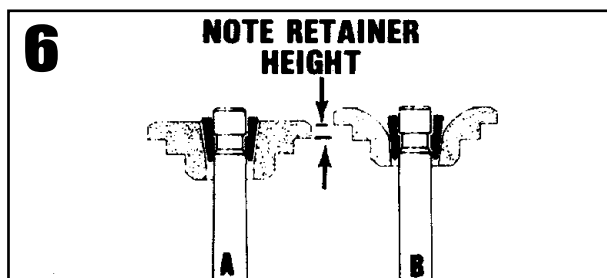


5. If the available installed height is greater than the dimension found on the cam spec card, valve spring shims should be installed as shown in Figure 5 to obtain the correct height, measuring from top of shim to bottom of retainer as shown.



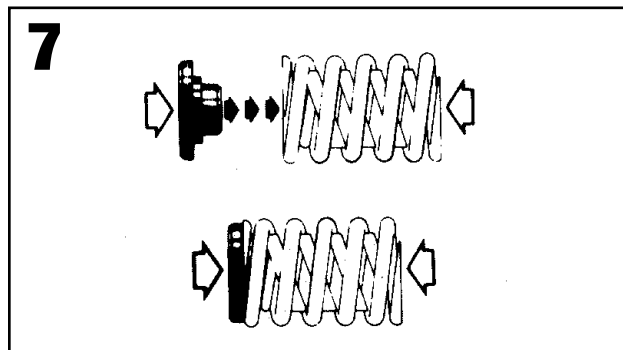
VALVE SPRING RETAINER DESIGN VARIATIONS

6. Each and every engine has its own unique valve train characteristics, hence, the reason for different valve spring combinations and valve spring retainer configurations. In Figure 6, "A" shows available spring height lower than "B". Our catalog should be consulted for the correct retainer for each application.



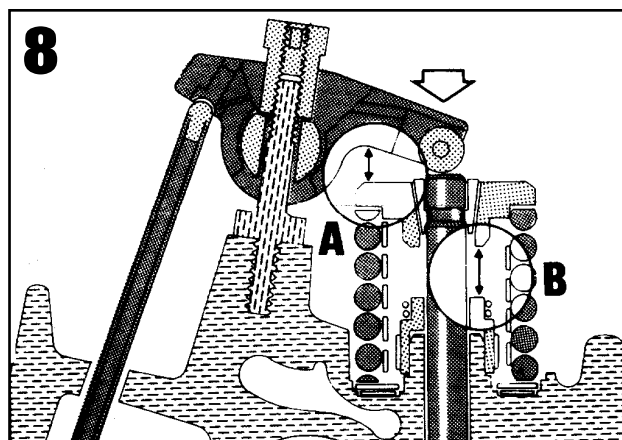
ASSEMBLING VALVE SPRINGS AND RETAINERS

7. In most cases, the retainers have a press fit and can usually be assembled on the valve spring by hand (Figure 7). If more pressure is needed, a vise should be used to press the retainer into the valve spring. This press fit is necessary to prevent valve spring spin and retard retainer "flaking" under hard use.



CHECK FOR ROCKER ARM INTERFERENCE

8. During engine assembly, rocker arm to retainer clearance should be checked closely with the valve closed. Area "A" of Figure 8 shows the clearance with the valve open. Check this clearance with the valve closed. If less than 1/32", the spring retainer must be changed to a different type or a different length pushrod must be used. Contact our performance consultant staff if unable to achieve proper clearance.



CHECK FOR SEAL INTERFERENCE

9. Area "B" of Figure 8 shows an excessive amount of clearance between bottom of the retainer and top of the seal with the valve at full lift. The minimum acceptable clearance should be 3/32". If less than this you must re-machine the top of the guides with the proper seal tool.