

## **BACK TO BASICS – Valve Seats**

The most critical sealing surface in the valve train assembly is between the face of the valve and its seat in the cylinder head when the valve is closed. Leakage between these surfaces reduces the engine's compression and power and can lead to valve burning. To ensure proper seating of the valve, the valve seat must be:

- Correct width
- Correct location on the valve face
- Concentric with the guide (less than .002" runout).

The ideal seat width for automotive engines is 1/16" for intake valves and 3/32" for exhaust valves. Maintaining this width is important to ensure proper sealing and heat transfer. However, when an existing seat is refinished to make it smooth and concentric, it also becomes wider.

Wide seats cause the following problems:

- Seating pressure drops as seat width increases.
- Less force is available to crush carbon particles that stick to the seats.
- Valves run cooler, allowing deposits to build up on them.

The seat should contact the valve face 1/32" from the margin of the valve. When the engine reaches operating temperature, the valve expands slightly more than the seat. This moves the contact area down the valve face. Seats that might contact the valve face too low might lose partial contact at normal operating temperatures.

Like valve guides, there are two types of valve seats – integral and insert. Integral seats are part of the casting. Insert seats are pressed into the head and are always used in aluminum cylinder heads. Most pre-1978 integral seats are soft cast iron. After 1978, most manufacturers began to produce cylinder heads with induction hardened cast-iron seats able to withstand the higher heat of exhaust applications. Insert seats are added to the cylinder head after casting, or as replacements for worn integral seats.

From the book, *Complete Automotive Engine Rebuilding and Parts Machining*. Reprinted by permission.