

## SB026

### Interference Fit of Valve Guides in Cylinder Heads

The interference fit of valve guides in aluminium and cast iron cylinder heads varies due to the difference in their coefficient of thermal expansion - aluminium has a larger coefficient of thermal expansion than cast iron ( $22 \mu\text{m/m} \cdot ^\circ\text{C}$  vs.  $13 \mu\text{m/m} \cdot ^\circ\text{C}$ ). Therefore, valve guides fitted to aluminium cylinder heads usually require greater interference than those fitted to cast iron cylinder heads. While the manufacturers' specifications should always be followed, a general guide for the fits should be:

- Cast iron and bronze valve guides fitted to **cast iron cylinder heads** require an *interference* of:  
0.025 - 0.038 mm (0.0010" - 0.0015")
- Cast iron and bronze valve guides fitted to **aluminium cylinder heads** require an *interference* of:  
0.038 - 0.051 mm (0.0015" - 0.0020")

It is advisable to heat the entire cylinder head, especially if it is aluminium, to about  $150^\circ\text{C}$  before fitting new valve guides. This makes it easier to insert the guides and minimises 'pick-up' of either the head or the guide. Cooling the guides by placing them in the freezer or in liquid nitrogen before fitting them to the heated cylinder head will make the task even easier. Fitting valve guides by this method greatly reduces distortion of the guide bores and cylinder head.

**Note:** It is imperative that all valve guide bores be checked after fitting to ensure they have the correct valve stem to valve guide clearance. The valve guide bores may have to be sized to give the correct clearance.

Before removing the old valve guides, it is a good idea to measure the protrusion of the guides into the ports (B) and above the valve spring seats (A). There is often a difference in the length of inlet and exhaust valve guides. Excessive protrusion of the valve guide above the valve spring seat (A) may result in valve spring cap and/or collets contacting the top of the valve guide. Excessive protrusion into the ports (B) can interfere with gas flow, heat transfer from the valve and correct valve seating.

