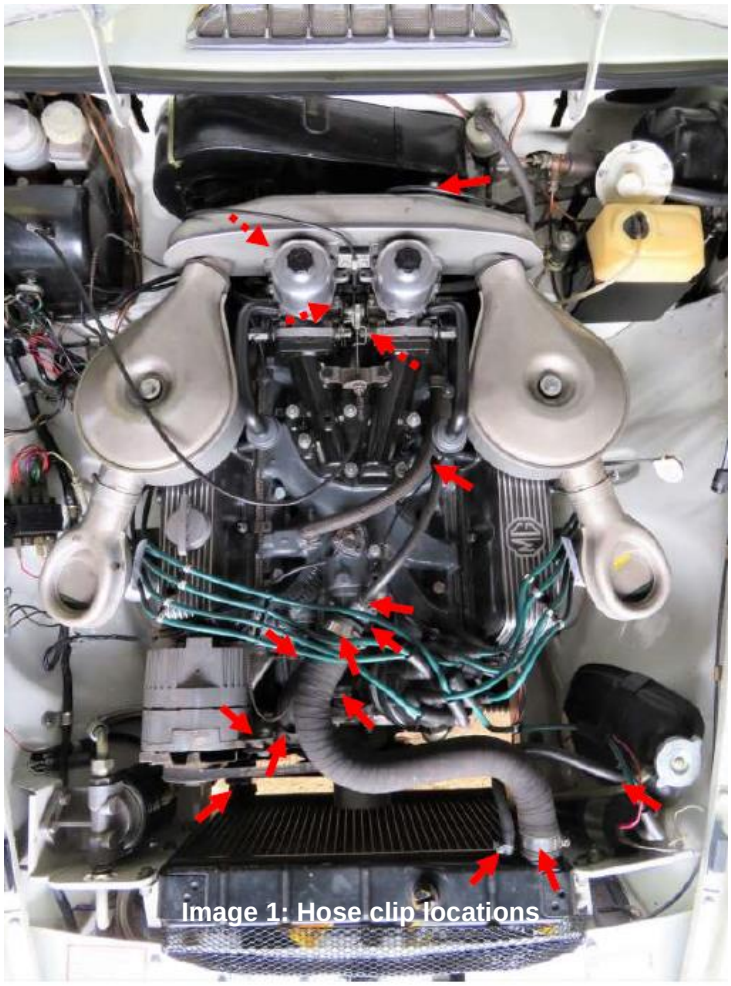


Image 1: Hose clip locations

Cooling system pressure testing and leak detection

Sealing the MGBV8 engine cooling system is particularly challenging as the system includes a large variety of joints both bolted and clipped. Of the bolted joints the inlet manifold to cylinder heads would appear to present the greatest challenge as it requires the simultaneous sealing of two junctions with four water ports at opposite corners. In practice, if assembled carefully these joints appear to be relatively trouble free. The other bolted junctions, thermostat housing and heater valve, are simple joints with gaskets and relatively easily made leak proof if the faces are flat and undamaged and new gaskets are fitted. More troublesome are the numerous hose to pipe joints. With 8 hoses and 16 joints, sealing requires careful assembly and checking. See **Image 1** for hose clip locations. As many of these will be obscured by later assembly the checking needs to be carried out while the joint is still visible and accessible. It also helps if the clips are oriented in such a way as to permit adjustment when the engine is fully assembled.

Jim Livingstone explains the issues which need to be addressed if sealing is to be successful are:

Hose reuse

Previously used hoses will have suffered permanent compression where they were clipped. The distortion is frequently not uniform and can cause local leakage when the hose is reused. If the hose is old and age hardened it should be renewed. If reasonably new and still resilient, a sealant can compensate for local irregularities. The writer has found a silicon sealant to be effective in such applications provided it is used sparingly. To avoid sealant entering the cooling system apply to the exterior of the pipe and only lightly coat the interior of the hose. Tighten the clip and allow the sealant to cure before pressurising the system.

Hose clip selection

Worm drive clips are generally selected for classic rebuilds as they have a smart appearance, are widely available in a large variety of sizes and can be adjusted. The latter can also be a disadvantage and if the wrong size is used and adjusted to fit, distortion and uneven clamping will occur – **Image 2**.

Image 2: Worm drive clip showing distortion

The remedy is to select a size appropriate to the joint, check for roundness at the tightened diameter and manipulate into a round shape before assembly. The hoses on the MG V8 like most of its contemporaries were originally secured with wire clips – see **Image 3**. No doubt, the main reason was cost but the wire clip had the theoretical advantage of a higher clamping load through the use of a full nut. A third option almost universally employed in modern cars but rarely in classics is the overlapping spring band – **Image 4**. This has financial and quality advantages for the manufacturer as it has low material and labour costs and ensures a capable process, none of which is relevant to the classic engine builder.

Image 3: Wire clips (on show MGBGTV8)

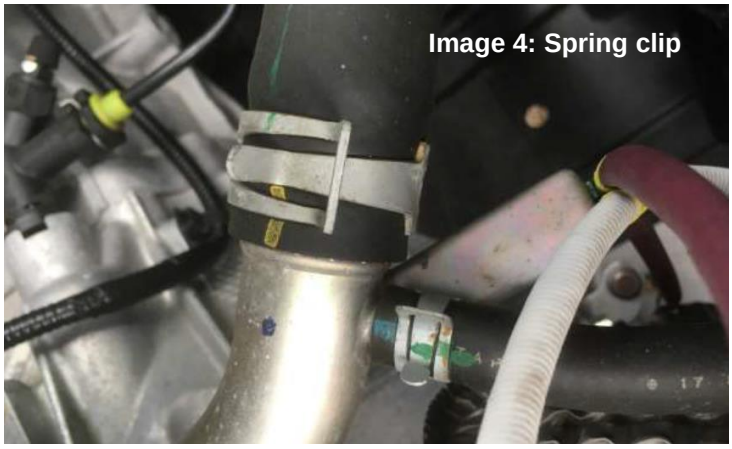


Image 4: Spring clip

Tube/Spigot preparation
The third component in the hose, clip, tube assembly also needs careful consideration. Following common practice, MG wisely provided swages in all its tube and spigot connections. Aftermarket suppliers are not so knowledgeable or considerate and the heater return pipe on the writer's V8 was not an original part and was highly polished and swage free – **Images 5 & 6**.

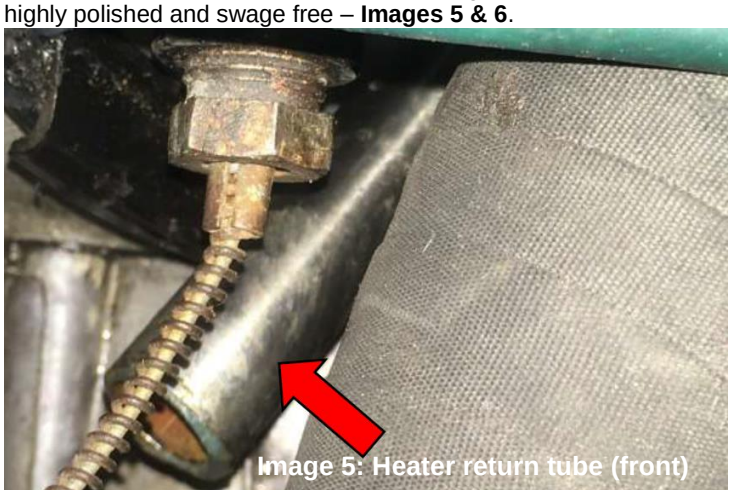


Image 5: Heater return tube (front)

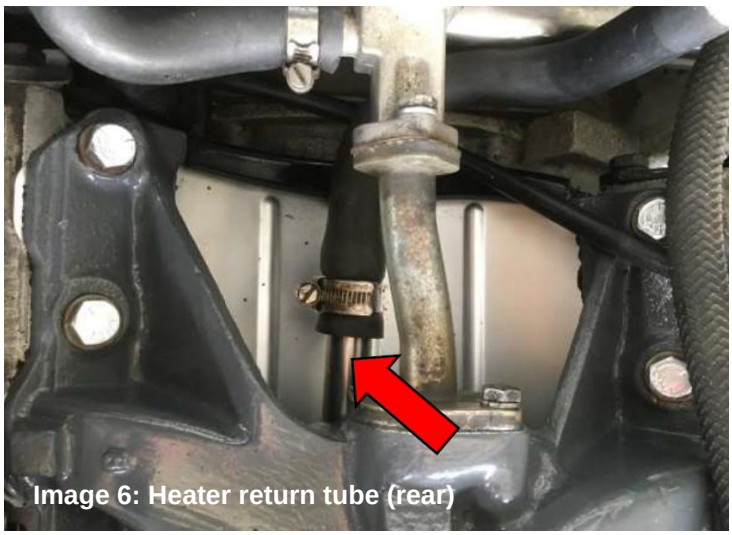


Image 6: Heater return tube (rear)

In such instances sealant will almost certainly be required to compensate for the absence of a swage. See the footnotes for an explanation of the term swage.

Pressure testing set up
Professional coolant system test equipment is available but as it is an infrequent requirement and much of the kit is adaptors to suit a variety of installations the expense and complexity are difficult to justify. The essentials are a non-return valve, a pump and a pressure gauge and these are conveniently (and inexpensively) found in a bicycle Schrader valve (**Image 7**), a tyre pump and a tyre pressure gauge.


Image 7: Schrader valve (cut from cycle tube)

The latter is not ideal as the target pressure of 15psi (1bar) is at the low end of the gauge scale but it is adequate if, as in this instance, detecting pressure decay over a period is the objective. The Schrader valve is cut out from an old bicycle inner tube (tubeless car tyre valves have too much over-moulded rubber for this purpose) and inserted into the hose from the radiator header tank expansion vessel – **Image 8**.


Image 8: Schrader valve inserted into expansion tank hose

This hose can be reversed to test the expansion vessel and pressure cap.

Procedure

1. Delay assembly of the carburettors and inlet manifold adaptor until the cooling system is tested. This will allow the heater hose connections (4) to be observed and adjusted.
2. Pressurise the system to 15 psi using the pump and gauge – **Image 9**.

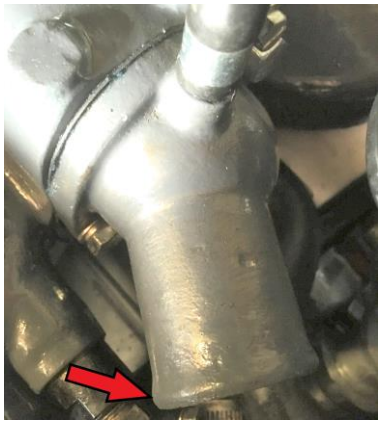
Image 9: Pressurising the system

3. If the leak is serious then it will be heard but locating it can be aided by using a length of hose and funnel as an ear trumpet.
4. If the leak is slight its detection can be assisted by applying a soapy solution by brush to the suspect area.
5. In either case tighten the offending clip and retest.
6. If this is unsuccessful dismantle the joint and inspect for defects as described in the prologue. It may be necessary to renew hoses or clips.
7. Once a satisfactory situation is reached leave the system pressurised for a prolonged period (1 hour at least) and observe if there is any loss of pressure.
8. When satisfied, reverse the installation at the header tank and test the expansion vessel and pressure cap.
9. Fill the system with coolant, run the engine and check that the level does not drop after purging of air.

Footnotes on some of the terms used in the note

Swage

In the context of this article the term describes the local increase in the outside diameter of a tube produced by manipulation. The purpose is to provide a step to resist the forces acting on an assembled hose when the system is pressurised. This is usually reinforced with a clip fitted over the hose upstream of the feature. A similar effect can be achieved by moulding or casting if the parent material is plastic or cast metal. The accompanying image displays the feature on the cast thermostat elbow.



Worm Drive Clip

A comprehensive explanation of worm drive clips is given in V8NOTE432.