It’s ironic that kit designed to make you feel cool is located in the hottest part of the car. The extremes of heat in the underbonnet environment eventually take their toll on a vehicle’s air-conditioning, encouraging rubber pipes to crack and become porous. And if crucial servicing is missed, moisture mixes with the oil and refrigerant to create an acid which can harm the system internally, further increasing the risk of leaks.

Indeed, it’s been estimated that around 10-15% of refrigerant is lost to the atmosphere each year from a vehicle’s air-conditioning system. If left unmonitored, the system could easily become totally empty after several years. What exacerbates this loss is lack of regular use. A small amount of oil is present in the refrigerant to lubricate various seals in the system, including the crucial shaft seal on the compressor, so if the aircon isn’t used these can dry out and allow gas to escape.

Undoubtedly the most common source of leaks, however, is the condenser. Situated in a highly vulnerable position at the front of the car and made from very thin aluminium, it’s prone to being holed by flying grit and gravel. And if any moisture is allowed to build up through lack of maintenance, acid can quickly cause it to corrode.

While a leaky aircon system is annoying because it will have an impact on the efficiency of the car’s cabin-cooling and demisting functions, as well as affect the vehicle’s climate control, if the leakage rates exceed the guidelines

BLOWING HOT AND COLD

Most of us only worry about our aircon when it stops working. But regular servicing is crucial to prolong the system’s life and ensure you’re getting the best performance out of it, as IAN CUSHWAY explains.
set out under the MAC Directive 2006/40/EC, it can’t simply be ‘topped up’ again. Regulations concerning mobile airconditioning systems (MACs) introduced back in January 1, 2008, state that cars using R134a refrigerant must not exceed the maximum annual leakage rate of 40g for cars with a single evaporator system. If they do, investigation must be carried out to find out why and action taken to make the car’s system hold its gas better.

In a nutshell, ‘F’ Gas regulations say it’s no longer acceptable to simply keep refilling a leaking system with fresh refrigerant without finding out where the gas is leaking from and carrying out necessary repairs first.

With all this in mind, we asked airconditioning specialist Vehvac in Kent to guide us through the service procedure. Remember that apart from carrying out a visual inspection to identify obvious leakage points, you can’t do any of this yourself without the necessary certification (for details about training, please turn to pages 60-61).

OK, so that car needs a new condenser before the system is retested and recharged, so the loyal former CM project Audi A6 Avant is wheeled in instead. This is what the gauges should look like, with between 2-4 bar pressure being the norm.
Although the Audi's aircon seems to be blowing cold air, we don't know how efficient it is or how much refrigerant is in the system. We carry out an efficiency test with the vehicle's Climatronic climate control set to its coldest setting, with the fans full on and the windows and doors shut.

After being left running for several minutes, the face vent temperature is measured at 6°C. Not bad, but there is room for improvement.

There's usually a sticker inside the engine bay confirming how much refrigerant needs to go back in – in this case, 650g. However, the majority of test machines have a database which will look up the car's make, year and model, then supply this dose automatically.

The machine goes through a series of processes, the progress of which is displayed on the digital readout as well as via the 'traffic light' system on this unit. It starts with a cleaning phase, where the old refrigerant (along with any moisture vapour produced as a result of the vacuum) is sucked out (recovered) and filtered. Switching off momentarily after the first 'draw', the pump recognises when all the refrigerant has been removed and will even switch off if it detects a leak. The vacuum stage can take 20-30 minutes.

The aircon servicing equipment recovers and recycles any old refrigerant, acting like a big washing machine. However, with natural loss inevitable, the in-board cylinder of R134a refrigerant will eventually be used up.

PAG oil sits in the compressor to lubricate the system and, when the old refrigerant is recovered, a small amount of oil is drawn out as well and this is put into a separate waste bottle. When charging the system, the machine cleverly injects the correct amount of fresh oil and dye into the system.

A hard copy readout will confirm how much oil and refrigerant was removed and how much has been supplied to charge the system, providing a useful service record.

Proof of the pudding is the air temperature coming out of the vents. After the service, on the same settings as used previously, it had dropped from 6°C to 4.8°C. Job done!

Finally, two stickers are issued – one confirming the addition of dye to aid future leak detection, and another reminding us that the next aircon service will be due in 12 months' time.