



## PREMIUM Bonds

Take one accident-damaged Aston Martin, bake gently in an oven at 80 degrees Celsius for 80 minutes or until done, then return to delighted customer. **John Simister** receives a masterclass in bonded aluminium technology at Aston Martin Works Service. Why choose anywhere else?

This recipe is in fact the secret to 'cooking' the orange epoxy-type adhesive that holds together the aluminium structure of a DB9, a V8 Vantage or a Vanquish. These are not cars built from welded steel sheet like most cars, so normal rules of construction and reconstruction don't apply. Instead the aluminium, be it sheet metal or extrusions, is bonded and riveted to make a structure of extraordinary rigidity and near-immortal life expectancy. 'There is no reason why a modern Aston Martin should not last forever,' Dr Ulrich Bez has said. Sometimes, though, that life is threatened by a chance impact with something solid and errant. Your Aston Martin has had a crash. What now?

When it was built at the Gaydon factory, the bare structure, or tub, was cooked at a high temperature to cure the glue. But it's different when you have to recreate part of the structure, post-accident, because cars are full of things that might melt. To strip the damaged car to its bones, then put it all back together, would take a long time and be very expensive. Solution? A new glue. 'A few years ago, if the tub was damaged, we'd have to build the car into a new one,' says Nigel Woodward, accident repair centre supervisor at Aston Martin Works Service, Newport Pagnell, which returns around 15 cars a month to their pristine state. 'But now we can repair them and nobody can tell. An expert would really have to dig to find any evidence.' The new adhesive is orange, like the original, and just as strong, but can be cured at a lower temperature. A heat of 80 degree Celsius won't damage the Aston Martin's leather, plastic and rubber components, and has long been used in the repair industry for baking new paint finishes.

The process goes like this. An Aston Martin arrives with structural damage: Nigel shows me a DB9 Volante that ran over something large and jagged and destroyed the left half of its floor. The car is mounted on a jig to make sure its dimensions are still correct and will stay that way as the damaged sections are removed. Components are removed to gain access to the damaged parts, which here meant the entire powertrain of engine, transaxle and the hefty torque tube that joins them, plus the suspension and the brakes. The damage is then assessed, including possible cracks in the adhesive.

**The next stage is slow and laborious. Rivets are drilled out and then, softening it with a heat gun, the technician cuts along the adhesive with various sizes of oscillating saws and cutting wheels, leaving intact the aluminium that will remain in the car. Any damaged structural piece will be removed because, unlike steel, aluminium quickly loses strength if it is manipulated too much.**

Welding is taboo, too. 'We never weld these panels to repair them,' Nigel explains, 'because the heat damages the adhesive.' A non-structural piece may, however, be panel-beaten back into shape in the old-fashioned way Aston Martin knows so well from its past cars. Next, the residual adhesive is ground away and the new panels trial-fitted. When the technician is happy with them, the Aston Martin is wheeled into the dust-free booth where it will later be cooked. The aluminium mating surfaces are chemically cleaned and immediately a thin layer of adhesive – its components mixed in exactly the right proportions within its sachet – is applied to the aluminium to seal it. Aluminium gains a very thin layer of oxide in just 10 minutes if left unprotected, which would greatly reduce the strength of the bond.

Now the full bead of adhesive goes on, the panel is positioned and new rivets clamp it to the rest of the structure. Aston Martin uses self-piercing rivets when the cars are made, but with holes already present this time round Works Service uses monobolt rivets. The end result is the same, besides which the strength is in the bonding rather than the riveting. After two hours at ambient temperature, on goes the heat and the repair is complete. Aston Martin dealers have their own bodyshops, some able to take on bigger jobs than others, but a repair to a tub comes back to Works Service. But even the works won't repair a Vanquish tub in which the carbon-fibre windscreen pillars have been damaged, because it's impossible to replicate the way they are bonded to the aluminium. Other carbon-fibre Vanquish parts can be replaced, and new sections can be bonded in where there's no structural concern.

The same holds true for the composite rear bodywork of all DB9s, V8 Vantages and Vanquishes: the damaged section is cut off, a new piece is shaped to fit the cut, the edges are bevelled and a new resin matrix, replicating the original, is flowed in to make an undetectable repair. And for bonding composite wings to the tub, Works Service uses the original, flexible polyurethane adhesive in black. Works Service is a fascinating place. Mere yards from the high-tech repair bays for the new generation, fine classic-era Astons are being serviced and an early-1960s Lagonda Rapide is undergoing a full restoration. Will today's cars one day find themselves in among the classics? Maybe. For now, though, Nigel sums up the Works Service approach thus: 'The crucial thing is that people should never know we've been there.'