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See p102



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**THE BEST DIY TECH GUIDES**

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**WORKSHOP**  
Masterclass – Alloy Tanks





# TANKS FOR THE ALLOY MEMORY

If your fuel tank or radiator is past its best, irreparably damaged or plain inadequate, fear not. Skilled, British fabrication using the latest materials will transform its efficiency.

WORDS BY GARY STRETTON PHOTOGRAPHY BY MICHAEL WHITESTONE

**L**ike Trigger's famous broom, my Peerless' fuel tanks and radiator have been subjected to so many alterations, I doubt there's anything original left. A few years back I used a tank sealer to halt the fuel tanks' internal corrosion. Until I fuel up, I have no idea how effective the repair will be. Following stories of ethanol incompatibility with older tank sealing systems, I now feel I'd be gambling by using them. The Peerless' twin tanks have design flaws such as fuel sloshing when cornering, accelerating and braking.

Ditto the radiator. Although seemingly re-cored in the past, it still has the old side frames and top and bottom tanks fitted. It's not pretty. Peerless radiators fracture around the top hose outlet/expansion tank area. My theory is the lack of movement caused by rigid radiator top hoses instead of the more forgiving concertina type design weakens the brass joints. Added to the rad's Standard 8 humble beginnings, it's no wonder many owners struggle to reduce under bonnet temperatures to acceptable levels. Rather than cut holes in the wings and go 'Aston Martin' with side vents, I wanted a solution that wouldn't compromise the bodywork – an alloy radiator. An efficient modern core alloy radiator dissipates heat beyond the scope of what was available in 1959 for the car. Some owners have successfully fitted

Land Rover radiators but I like the monolithic style of the original radiator and was keen to retain its unique shape in the engine bay.

## Who to trust?

Finding a company flexible enough to create one-offs and low-volume production required careful consideration on my part. Finding a manufacturer able to supply owners worldwide off-the-shelf was also my aim. There are more surviving Peerless' in the United States than the UK, so naturally owners there would be keen to benefit from a remanufacturing initiative here. Forge also have an American base – ideal for owners across the pond.

The clincher is they make products mainly by hand. No expensive CNC machine programming costs to contend with. Therefore, their skilled fabricators and craftsmen can make instant changes to designs if necessary. This approach has served well the numerous customers in motorsport they support. For members of the Peerless and Warwick Owners Register, this flexibility is a huge bonus because many cars are likely to have been modified over the years due to the lack of available spares.

The process began when I visited their Gloucester premises with my radiator and fuel tanks. Discussing how I'd like to improve aspects of their design, Forge advised on how best my suggestions might work. For example, I asked for a threaded electric fan thermo-switch hole on the top header tank. They advised it was better to site it on the lower tank to ensure it was always in contact with coolant. I like that. In no rush, I left the items with them. A few weeks later, pictures of the rad and tanks arrived. This R&D work was done in-between their scheduled work, hence we were unable to photograph the work step-by-step. However, the manufacturing process was fully explained by fabricator Dominic Hensley when I collected. The results are visually and technically superb.

## Contact

### Forge Motorsport

Gloucester

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# WORKSHOP

## Masterclass – Alloy Tanks

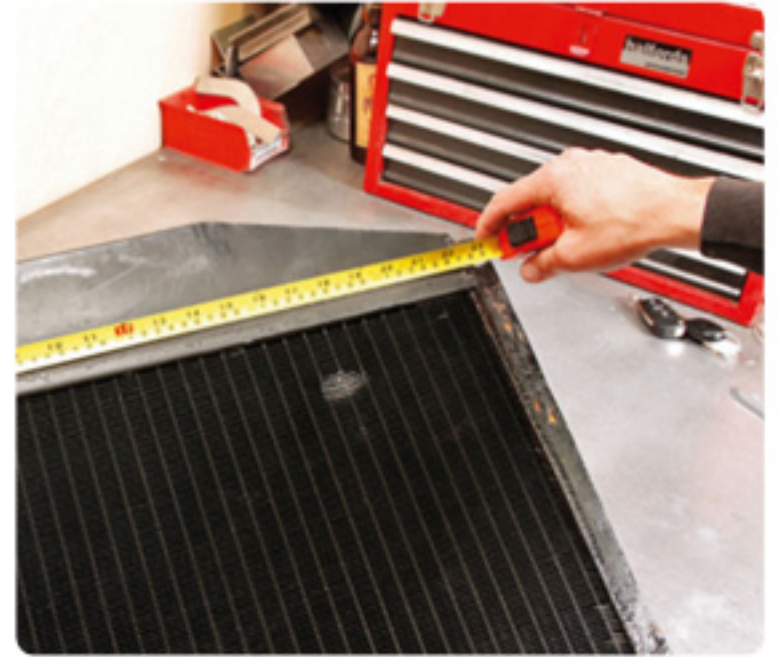
### ASSESSMENT AND MEASURING



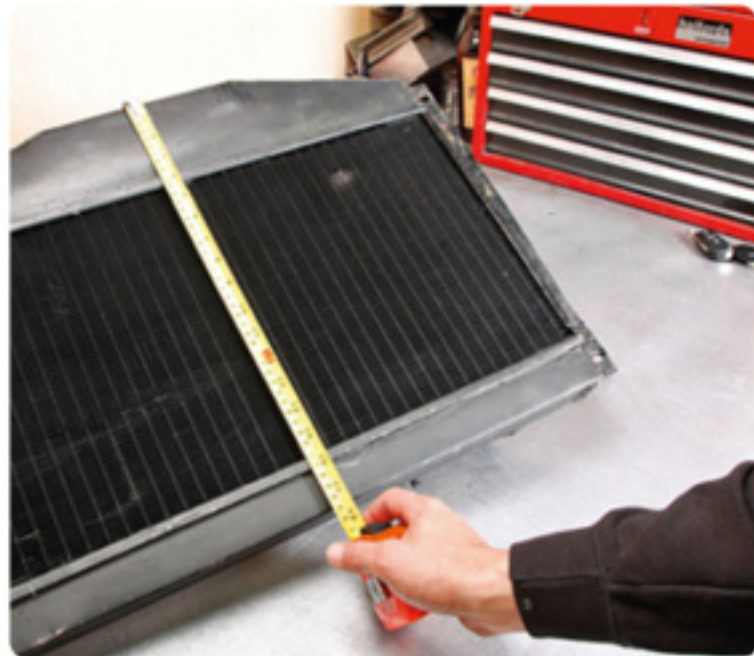
**1 Think it through**  
Any differences to the original spec must be considered early so they can be factored in, especially if more complicated alterations are necessary.



**2 Adding and moving**  
For example, I had requested the Peerless' radiator had a thermo switch inlet and that the drain tap was moved away from the bottom hose for easier access and improved drainage.



**3 Core measurements**  
Dominic took plenty of measurements. Core size measurement determines the overall dimensions of the finished radiator, including top and bottom tanks.



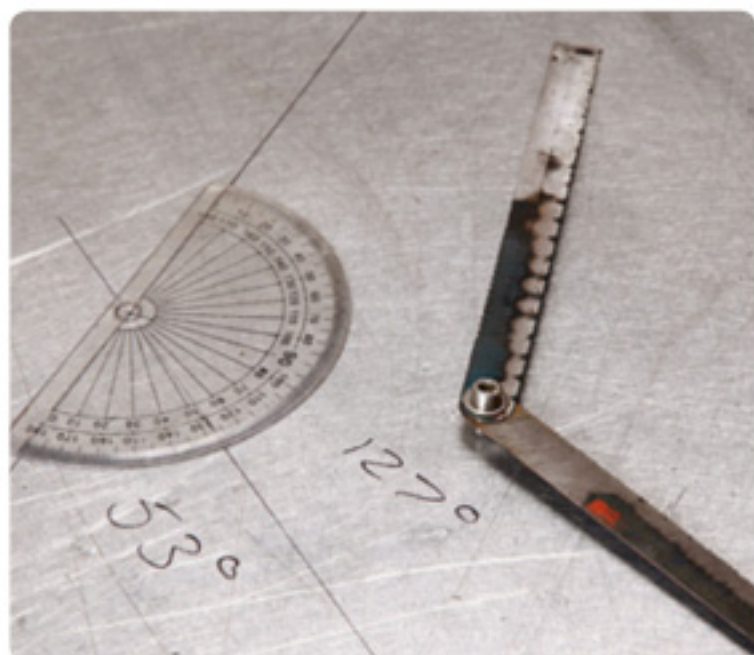
**4 Off-the-shelf pays**  
It's preferable and considerably more cost-effective to adjust other elements to fit an off-the-shelf core than have a bespoke version made. That meant a 20mm taller core was used, which was no bad thing.



**5 Isn't that a...?**  
His compact, trusty home-made angle-checker is a great idea – both halves of a broken hacksaw blade bolted together.



**6 Angle data**  
He then transferred these to his bench top...



**7 Add, subtract...**  
...and worked out the reverse angles he needed.



**8 ... just don't forget**  
Pen and paper notes record the data and goes with the work as it progresses.



**9 The best method**  
Areas such as the filler neck required these pieces welded together for strength. Dominic used 3mm aluminium sheet here and on both the top and bottom tanks for superior strength compared to the brazed brass original items.



### IN THE WORKSHOP



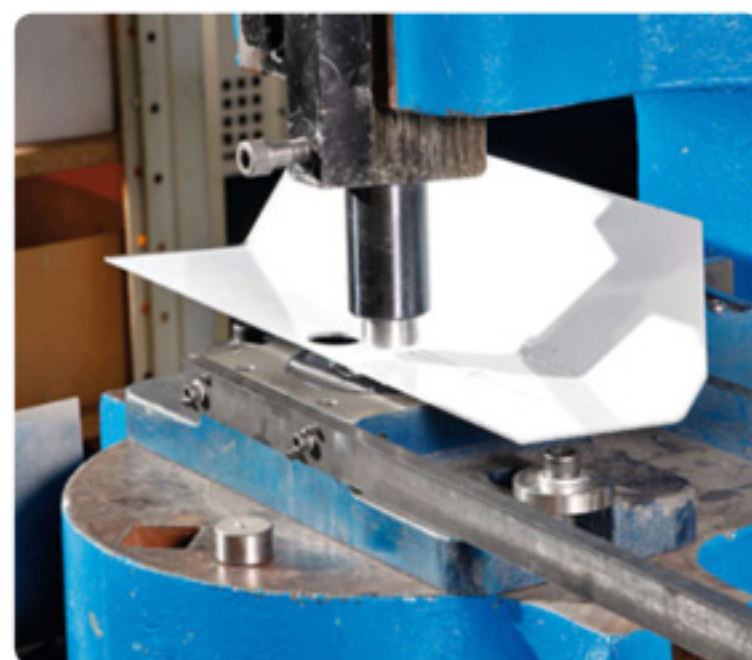
#### 1 Protect as you go

Forge have a variety of new and old-school machines and tools for fabricating products. All sheet aluminium is vinyl-backed to protect its polished finished during product manufacture.



#### 2 It's a snip

Sheet aluminium up to 4mm thick is cut using a light/shadow-guided guillotine for accuracy. The 3mm sheet used to strengthen my rad's header tank and filler neck was cut like butter.



#### 3 Punching hard

Holes for hose outlets, thermo switches and so on, are cut out using a hand operated hole punch. It's quick, fast and effective.



#### 4 Making the mark

It's also used for stamping their customary logo on all their products. Dates and fabricator initials are added, too.



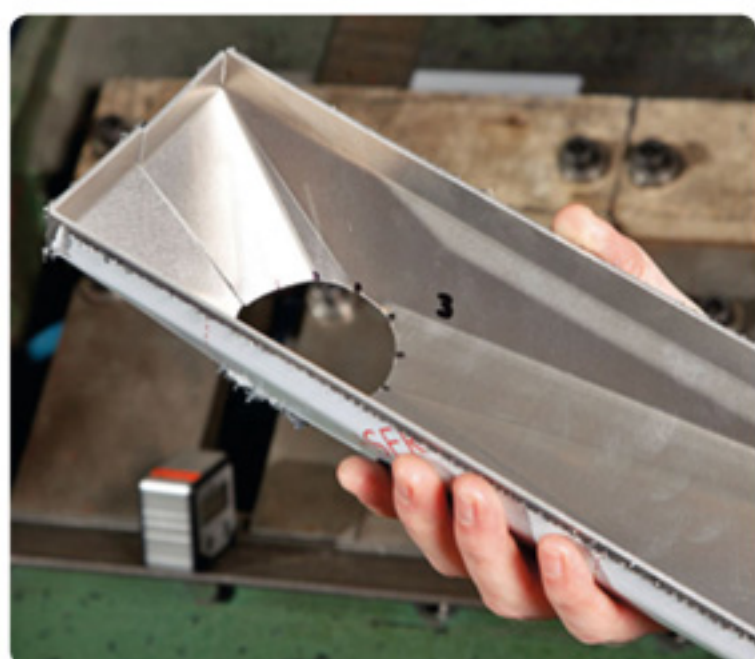
#### 5 Bend me, shape me

Most folds are created on a large hand-operated folding machine.



#### 6 That way inclined

The angles Dominic measured are easily transferred using this clever digital angle-finder (inclinometer).



#### 7 Knowing how

Seemingly complex folds made in series allow fabrication of items such as this intercooler header tank.



#### 8 Outlets by hand

Outlet pipes are made from pre-formed pipe, cut to length and given a hose-retaining bead using a hand-operated swaging tool of 5-6mm width.

### FINISH



#### 9 All together now

All the cut and formed elements are then skillfully TIG welded together. Dominic's welding, like his colleagues, is so good, no further dressing is required.



**Cell foam benefits**

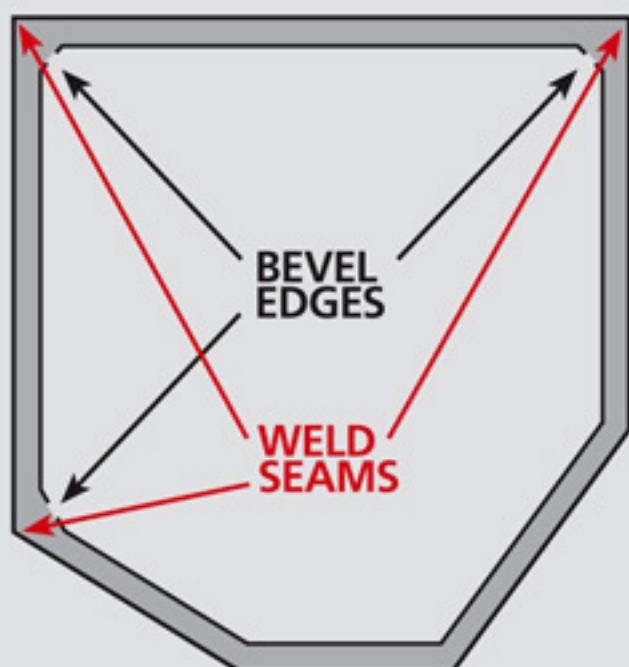


Lightweight and capable of suppressing explosions.

Cell foam is common in racing car fuel tanks to avoid sloshing and suppress explosions from fuel spray if the tank is ruptured violently. Makes me feel better about them being mounted in the sills. It also has another advantage, as I discovered – sound deadening. Compared to a hollow original tank, the new fuel tanks hardly resonate. The swage lines Dominic incorporated for strength also reduce resonance and increase the strength of long sections of aluminium sheet.



A VDO sender unit is required when cell foam is used.



Shaping the cell foam clear of the weld seams prevents it from igniting and ruining the tank during TIG welding.



Dink and donk – huge difference in resonance.

**Fitting the foam**

I was curious to know how the foam is inserted and the tank welded up without igniting it. Dominic explained the trick. The last section to be welded up should be large enough to insert the foam through and small enough to minimise welding required. That meant the end pieces on my tanks. The red hot welds are kept away from the foam edges by cutting bevels into the foam along the weld seams. The aluminium dissipates heats rapidly, so as long as the fabricator gets these factors correct, the foam doesn't ignite. If it does ignite, the tank is scrap. No pressure then...

**TIG welding**

Dominic used his TIG welder on a continuous setting for 3mm alloy. As is the case, specialists who use their tools daily, know the best settings for particular aluminium thicknesses. Forge use Technical Argon gas for its purity. Its properties ensure easier sparking on strike-up and good arc stability.

The use of cell foam means the standard swinging arm fuel sender unit cannot be used. Instead, I'll need to source two readily available VDO units of the correct length.

**Heavy metal ban**

On first reaching to pick up one of the fuel tanks the weight reduction caught me totally by surprise. The same is true of the radiator. To establish the difference, Forge use a set of traditional scales to weigh old and new. The differences are dramatic:

Old fuel tank	8.2kg (18.07lbs) x 2
New fuel tank	4.6kg (10.14lbs)
Old radiator	7.48kg (16.5lbs)
New radiator*	6.12kg (13.5lbs)
	*with cell foam and 3mm alloy

**Total saving 8.56kg (18.87lbs) CM**



Lighter, stronger and more efficient. The dramatic weight saving is a welcome bonus.



Lighter stronger, safer. The twin fuel tanks are a world away from the marginal, tired originals.



Super-efficient radiator core and use of aluminium will improve cooling way beyond the limits of the original.