

Tuning work – MB TS1, Power Valve 230

TUNING WORK MB TS1 POWER VALVE 230

I've already tried to explain how to read a dyno graph and show how a Scooter will run looking at these graphs. Here I will try to explain how an engine can run in the right hands and at the end you can see a graph.

Firstly the Mark Broadhurst Power Valve cylinder was a one off development based on producing a new cylinder kit which ended up been the Race-Tour kit. We looked and developed a TS1 style one off cylinder but thought a better seller would be a wolf in sheep's clothing, a torque monster over a rev monster style engine which would aid 90% of Lambretta riders. Part of our on going development for perfection was this cylinder. This cylinder started out as a TS1, we found a snow mobile Rotax cylinder using a Power Valve which worked on exhaust pressures, all quite simple with the need for special electronic ignitions. This power valve used a similar stroke and bore to a TS1 so was ideally suited to the pistons diameter. The power valve area was cut from the Rotax cylinder and the same area was machined away on the TS1 where it was all welded in position. Aimed at touring we looked at what reed blocks were available and went down the road of reducing the reed valve to suit the Small Rotax reed block as also used on the GT190 cylinder, this allowed Mark to make one off inlet manifolds to suit the 25 and 30mm Dellorto's which could run through a standard air filter box. To do this the inlet port was fully welded up and ground away to suit, the top and bottom of the cylinder gasket areas were welded to improve cylinder strength. The base had enough area to fit an inlet port into the casing, the transfers were also made a little larger and flowed. All this work was cleaned up and fins ground to suit making a pattern if we decided to put it into production.

As you can read below the cylinder worked, aimed at touring and not full bhp, Sticky called it a 'peach to ride' in a Scootering article! Through developing the kit, it needed many hours of dyno time to get the valve to work in the way Mark wanted. It was the Power Valve which stopped us from producing the cylinder, it came down to cost and was not idiot friendly! We ended up developing a Standard TS1 cylinder with no welding or anything special which became a better ride from start to finish, showing the PV was not the be all and end all to make a Lambretta work well, the main offending article was the small reed block restricting it too much, but it did allow us to use a 30mm through the air filter box.

Anyway..... It's not the most powerful engine I have ever done, chasing horse power isn't the be all and end all you will see why.

This is a story of Marks TS1 230 Power Valved Pushpak engine. It had done 900 miles to the French Euro no problem, then on the way back for no real reason it melted a piston, seized and trapped the rings. Running late 4 of us had everything stripped and a new piston fitted less than 30 minutes. The next day it did exactly the same thing, but this time I was at the back on a motorway and everyone left me! The joys of mobiles I said 'carry on, get digs

and I'll see you in a bit'. Great, no problem, I got the tools out and strip the engine again, umm but I fitted the spare piston yesterday! This was going to be fun! There were parts all over the hard shoulder, the highway people pulled up, looked at me with a strange expression and left! The only problem was the sun was going down! The piston had done the same damage as the one earlier, I had two identical damaged pistons to play with. After an hour or so of filing the piston with a Swiss Army knife, swapping rings from one damaged piston to another the bike finally started and I made it to the digs only to find the bars had shut.... bad day or what?

Well I did get home, with some re-jetting crossed fingers and all. The reason for the failure was put down to the Power Valve shutting off at cruising revs when waiting for the others! It was fine riding like I normally do. On with the story, to say the piston was absolutely knackered and fitted with a damaged ring the bike ran fine once home! Quite amazing! So I left it as it was. One Sunday night the Scooter club was offered a Barbeque by one of its members out Barnsley way, it was one of those really nice Summers nights, a warm day and a warm night ahead, a perfect Barbeque night and a run out at that. Because of the weather we had a good turn out about 15 bikes, we all set off together with no break downs, the only problem was, not many knew where we were going! Local ride outs been local ride outs had the usual few giving it some and others sticking to the speed limits or slower! The road system is really complicated; some went left, some right and some straight on! I took it upon myself to turn around and collect the stragglers, any excuse to trash the bike. Eventually we all made it to our destination for food and chats.

By 10pm, I was getting itchy feet and ready to go, so were a few others, at 10.30pm I checked my watch, two Scooters where just setting. I asked Mouse if he wanted to come with me as I fancied a pint. Mouse said 'you'll never make it its Sunday hours' by the time I'd got the Scooter clear of other Scooters, put on my coat and helmet it must have been 10.35pm. Get to the pub for 11pm and I would get a pint. The only problem was I had to do 22 miles in 25 minutes!

The Barbeque was down a long un-adopted road more suited to a Motorcross than a Scooter, with little street lights it made interesting riding the good $\frac{1}{2}$ mile to the country road that would lead me back to the main road. There was a race on and the prize was a pint or two after a good nights barbeque! It wasn't long on the country road and I could see two Lambretta tail lights and the other club members giving it some on their TS1 motors. Within seconds I had caught and passed these two, one later said 'bloody hell your bikes fast! We tried to keep up but you just left us standing! I was so wrapped up in overtaking I took a wrong turn and the lads followed, I did an emergency stop, turned round and entered the main road home.

Woodhead is a well know road cutting over from Manchester to Barnsley and Sheffield, in parts it is very bleak and can usually be shut with snow. Not today it was Summer, there was only a few miles and I would come off the Woodhead road, this road home started with a 2 mile down hill into a big roundabout passed McDonalds at Tankersley, straight over down another dual carriage way and straight over the M1 roundabout. The start of things to come

this route home has 19 roundabouts to safely get round.

This is how it will be, flat out in every gear! Working the engine the best I could. Been dark, you can see the cars easy, the rear lights come so fast and go instantly. It was an evening with hardly any traffic, I had the whole road to play with. With 13 roundabouts to negotiate before I would get to the A1 and close to home. The road is the Dearne Valley and a local race track! If you've ever driven it, it's great. The roundabouts are all different, the main road pulls left, right or straight over. These are not little roundabouts, you can not see over them, they are landscaped with trees and bushes. You can not see a car coming from the other direction, the joining roads comes from a maize of old pit villages. It's a mess match of roundabouts connected by dual carriageways, I guess its to slow traffic! Using car lights as a guide I had to ride on either side of the dual carriage to take the best and fastest line, covering brakes and dropping down the gears and using all my skill to get from one side of the roundabout to the other. Some take you by surprise and the corners are tighter than the last.

These roundabouts are so different, they are lower than the main road, some are higher, some camber away and some camber in your favor! On a few, I ground the exhaust and stand on the other side, I hit the exhaust and had the back wheel off the ground! I had the bike in the dust on both sides of the lanes and had a tank slapper! One roundabout is entered down a big hill, where you have to come off the last exit, its big and can be held flat out in 2nd gear where as the next road drops away with from you again, you ride over a peak and both wheels came off the ground as I changed into 3rd. It's down hill again for about 3/4 mile to another big roundabout which you come off the first exit having used the fast lane with the head down, cut the corner and end up in the fast lane again!

There's a few more to get around then the dual carriageway turns into a normal road and you loose the street lights and the last 10 roundabouts are a blurr of bright lights, flipping the bike from left to right, getting the head down and keeping the front wheel down, changing gear and braking. By now I'm on a country road with no lights, blinded by cars going the other way, riding the white lines to see as I was over taking a few cars. Another roundabout and into the dark again to hit the outskirts of Goldthorpe and passed my mothers house. Thinking about all the bikers that do this road flat out and they deafen you when you're sat in the garden!

Then it's up to Hickleton with a flat out sweeping left hander in 4th gear, into a 30 mph limit, with lights then its Marr drag, a dark country road leading to the A1 and a straight drive home! 30-40mph limits! Right!

It really was one of those perfect summer nights, everyone must have been in the garden, the air was warm, hardly any cars, no police and not a speed camera in site! Driving up the A1 slip road was a pleasure, onto what was usually a very busy section with no cars. Flat out for another mile only to find a twat of lorry driver over taking another lorry at 55mph! As with a Coast to Coast race the horns are out and I went to overtake the two lorries between each other! Wait this was stupid, I had Alice on the back! and as I came up the double trailer wheels braked to drop back and went for the hard

shoulder maneuver, maybe not! It's just where the Police cars get on! It seemed like an eternity before the lorry got clear, by the time he put his indicators on I was passed on the fast lane, another few minutes through the housing estate and I stopped outside the pub 10.55pm.

I sent Alice to get the beers in, and I sent a text to Mouse, he couldn't believe it!

Google maps says 22 miles and should take 40 minutes, I did it in 20 minutes! Totally one of the best rides I have ever done! One to be remembered and ranked as high as the Coast to Coast race with Hammy!

Averaging 66mph, up a non adopted road, across country roads over 19 roundabouts, through three 30mph limits and two 40mph speed limits! It pulled 8'400 in top gear (Sx200 15 x 46 work it out)

What does it prove? I'm mad, well yes that's well known. But remember I was on a very sick piston from a few weeks before, even a sick piston can produce some good power, the Power Valve engine was in it's element, pulling two up, on and off the throttle and over 19 roundabouts to do what it did!

So lets look at the graph, its nothing really amasing it has no super high peak power, but it has a good spread and good torque over a good rev range. We use it when comparing how a customer's engine will run in reality. We know this engine, it has won the coast to Coast, it's been to the South of France and it did this outing as well as others. We now do engines without the Power Valve that rides like this, if not better. If you've had your bike dynoed, over lay your graph and compare it, you may learn something.

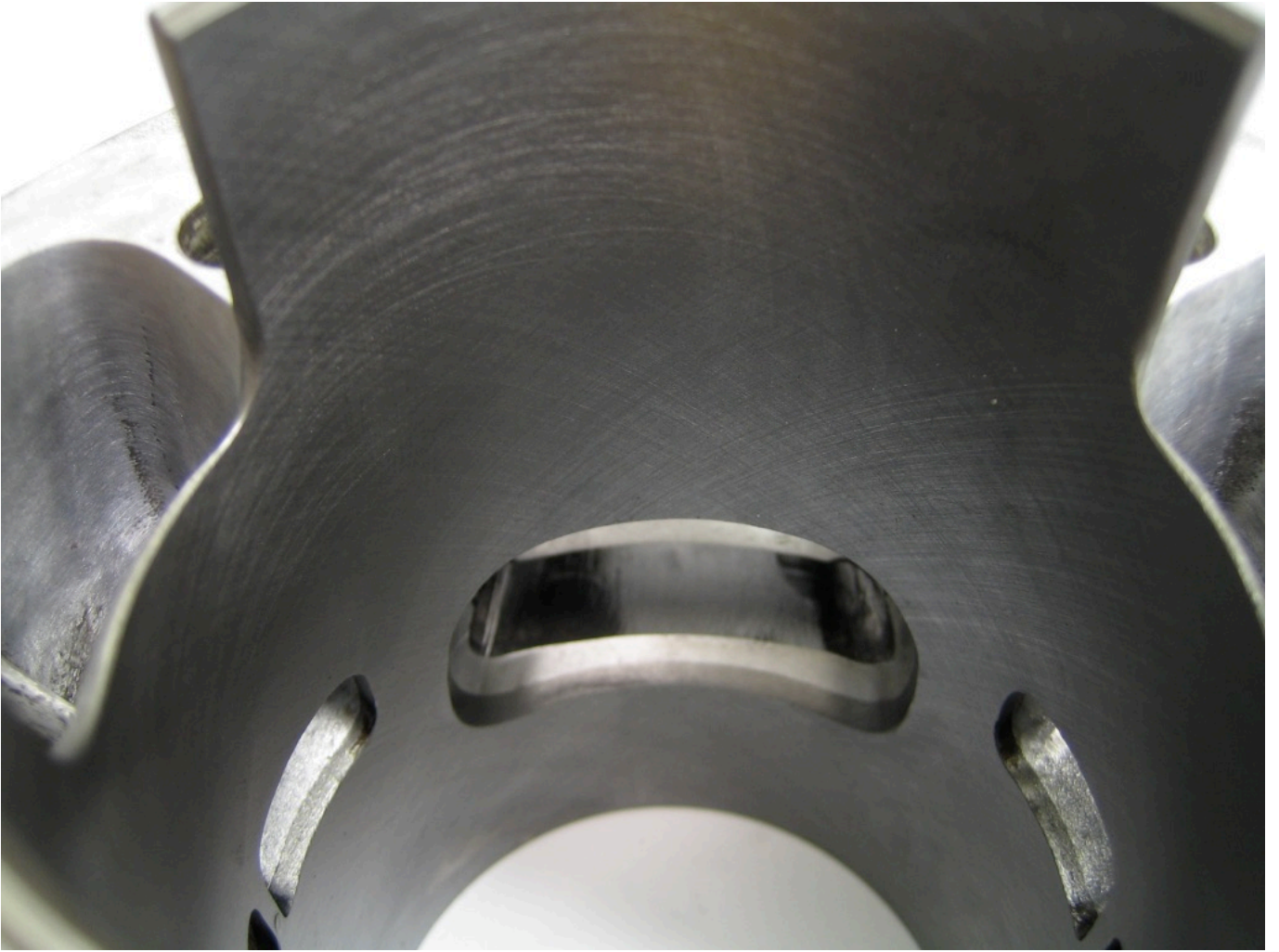
It's only showing 23bhp but over a nice wide spread with a nice curve, its the torque that's impressive 14 Ibs torque from 4000 to 8000rpm peaking at 18Ibs ft, showing you need to read the graph more that just looking at peak horse power.

If you've ever talked with Mark about questioning having a tune done he will say these key words, It's about an engine been rideable, driveable and reliable!

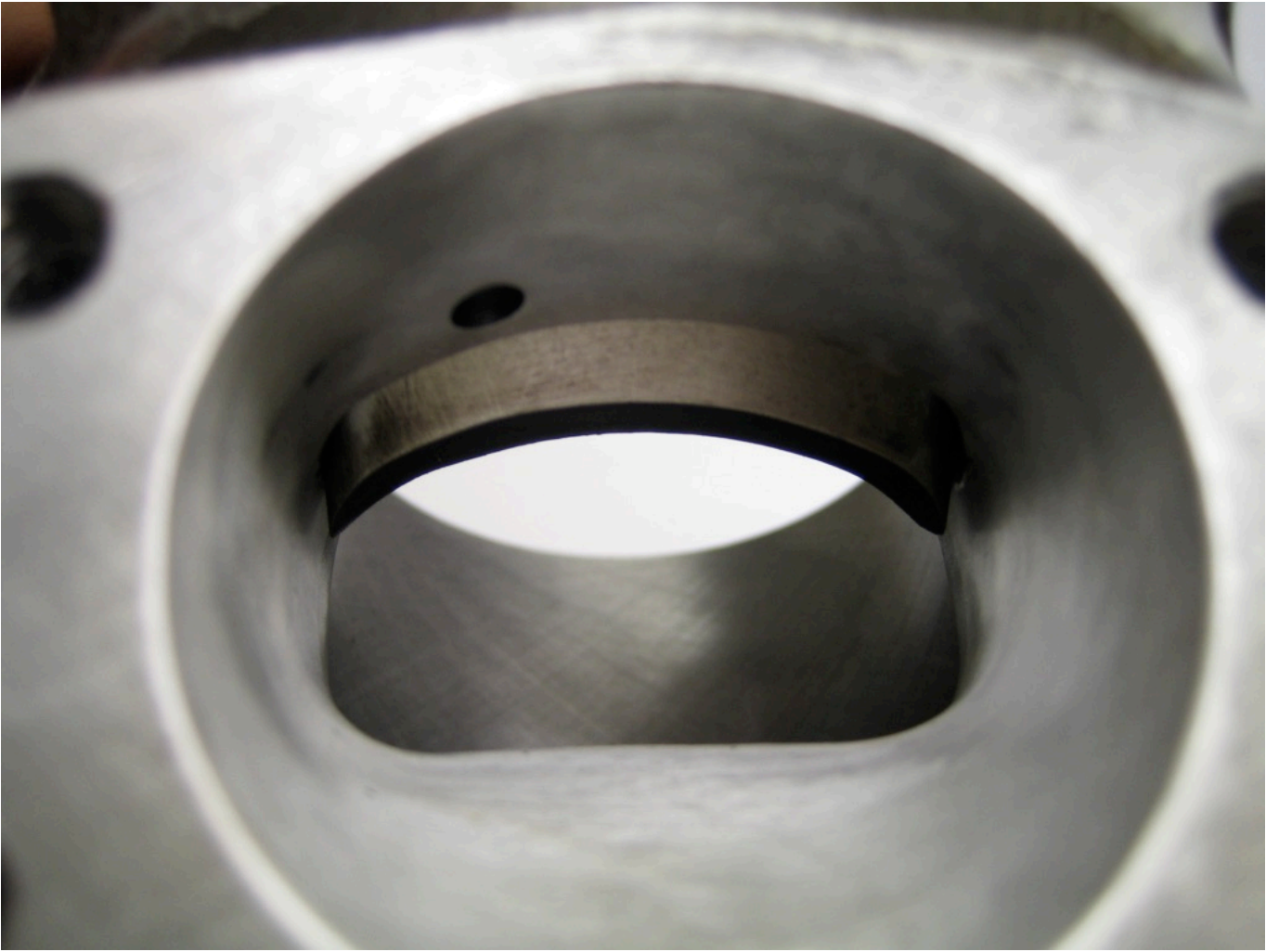
That will be a TTT a Touring Torquey Tune



This shows the alloy casting removed from a Rotax cylinder and welded into position on a TS1 cylinder



The new TS1 exhaust port showing the guillotine and iron liner



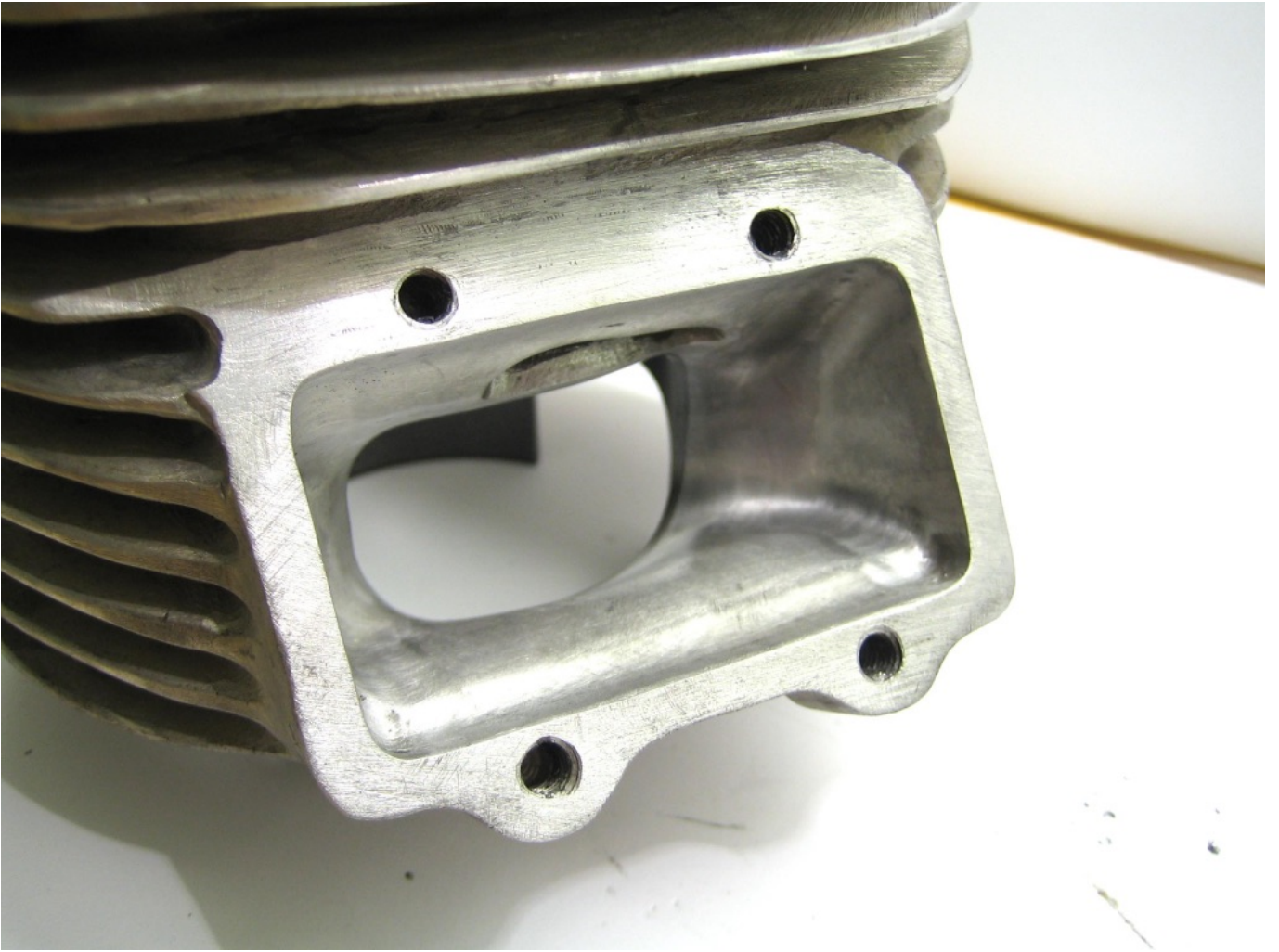
The view of the guillotine slot from the new exhaust port



The Guillotine in the shut off position which the best pulling power



New TS1 transfer feeds, single boost port and new inlet shape



New inlet shape using the GT kart reed assembly which was the limiting factor to power on this one



Hand made new exhaust stub to suit the Rad valve



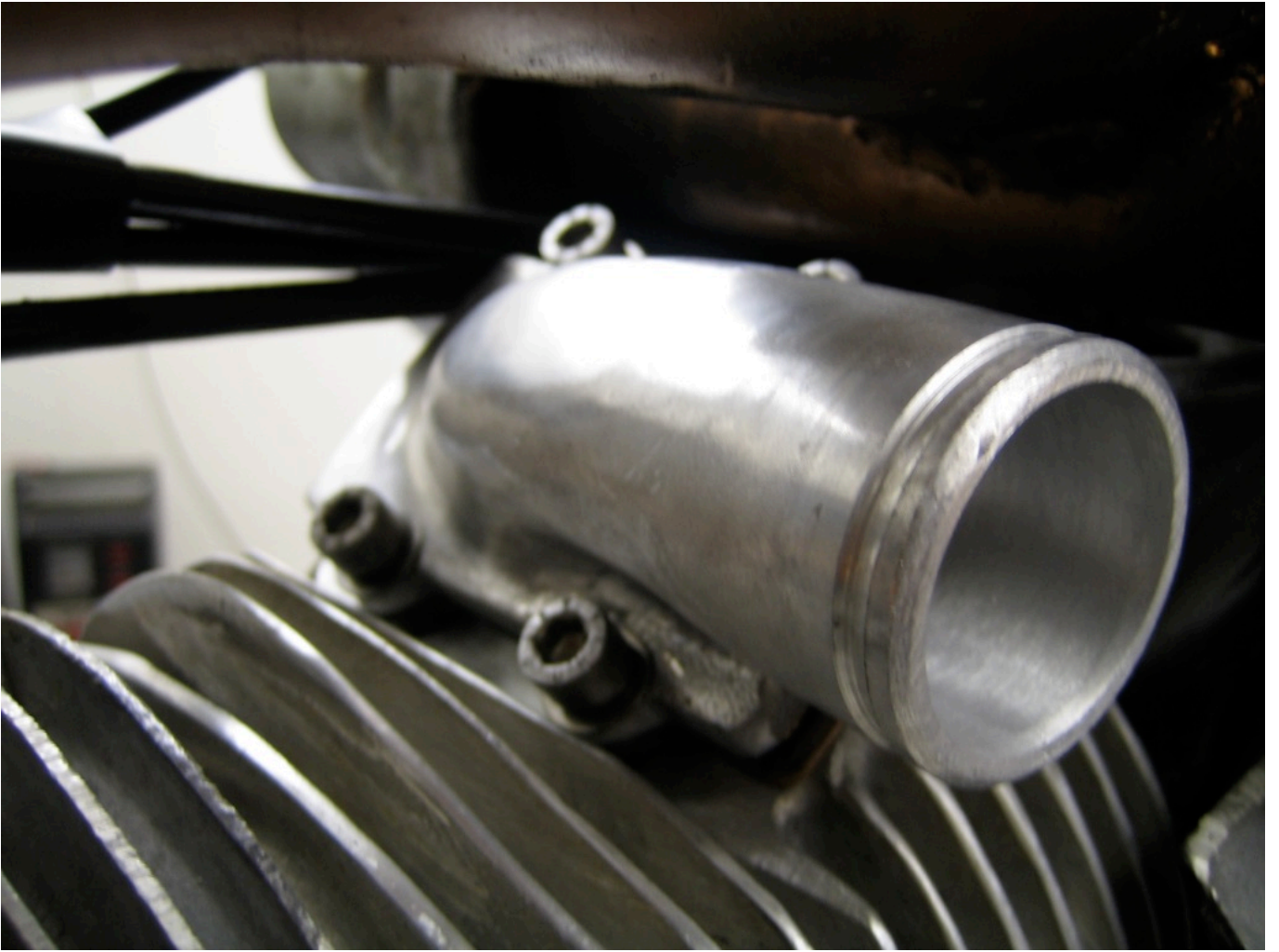
I made two inlet manifolds one for the left hand side one for the right hand side, by welding an existing manifold



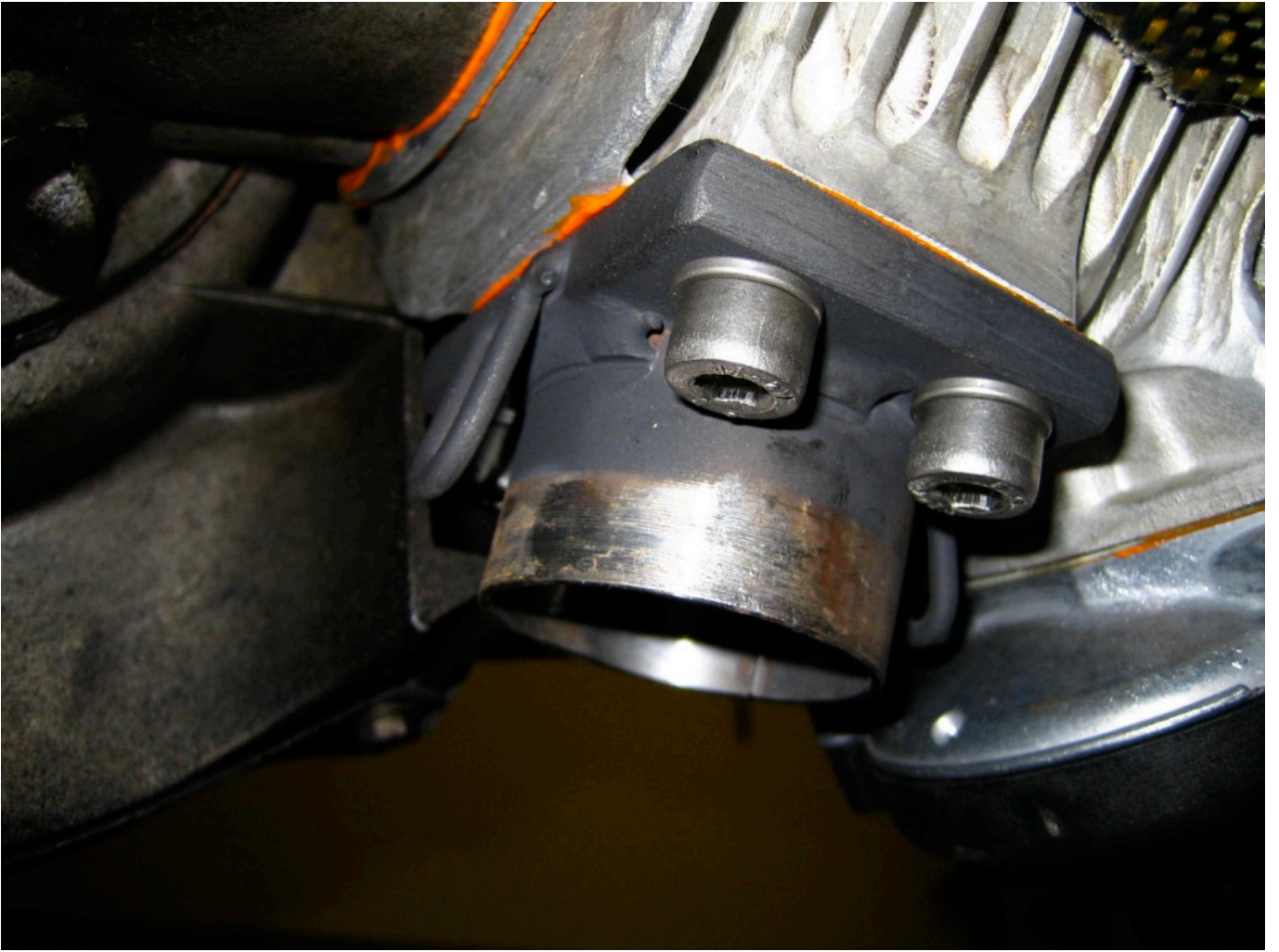
Left hand 25mm inlet manifold



The parts which made up the Rad valve



The 25mm fitted



New exhaust flange



Power valve fitted above the exhaust port



30mm inlet on the right hand side

If you have any questions please email mark@scooters.co.uk