

TECH: SPECIALIST

FUCHS DE LUXE

Few aspects of the 911 encapsulate Porsche's heritage better than the Fuchs wheel. We've come to see them being restored at Art Restoration's workshops at Holtzheim in Eastern France

Words: Johnny Tipler Photos: Antony Fraser



Fuchs wheels. Instantly recognisable, and immediately synonymous with Porsches and the 911 tradition. Indeed, there's something very satisfying about a row of individually coloured Fuchs, and that's what forms a focal point in the garage workshop at Art Restoration, located on a light industrial site in rural countryside at Holtzheim near Strasbourg, eastern France. It's the speciality of proprietor Patrick Pugin, and we're here to see just what the process of renovating Fuchs wheels involves.

There are two strings to Patrick's bow: Art Restoration, the main business also renovates Porsches, and the Fuchs wheel refurbishment is carried out under the Art

Wheels banner. In reality, though, all the work is carried out under the same roof, with dedicated spaces for specific actions to take place on wheels and on cars. In the depths of the building is a paint booth, a machine shop with tools and equipment to clean parts and remove rust at high pressure, high temperature and ultrasound, as well as smaller cubicles for grinding and polishing wheels. There's an engine and transmission shop which also takes care of carburettors, injection and ignition, and off-site is an acid bath where bodyshells are dunked before being painted black ahead of restoration work. Everything in the yard and the workshop looks spick and span, including the cars present, including an SC Targa, a 912, a couple of 914s and a 3.2 Carrera.

Patrick set up Art Restoration ten years ago, beginning with the rehabilitation of a 2.2 911E and a 914. 'I wanted to demonstrate the quality of the work I could achieve, and gradually I started to have more restorations to do, and now I've got a team of 15 people working here.' They are concerned solely with air-cooled Porsches, and only street cars: 'we don't have anything to do with racing cars,' says Patrick; 'and that avoids many complications, because working on racing cars needs a lot of experience and we are still building our experience on street cars. We go very deep into the heart of our restorations, and we focus on the minutest detail, right down to the correct screw for a particular model year. This is what clients expect, and a lot of cars coming out of the

More for show than go, this is the end result of a full Fuchs restoration at Art Restoration/Wheels

So that's where all the Fuchs have gone! Wheels awaiting restoration at Art Restoration. Right: Date stamp on inside of wheel indicates date of production as June 1969. At 15in/6in it's for a 911S, T or E



workshop are going straight to shows, exhibitions and concours, so this is why they are so particular about our methods and level of quality.'

It wasn't long before Patrick became aware of the need for specialist treatment for Fuchs wheels. 'I tried it myself with reasonable success, but I found a guy in Germany doing just Fuchs wheels and I worked with him one time. He told me he was going to retire, so I paid him for his knowledge, as well as some special machines, and started my own company, Art Wheels, (alongside Art Restoration) doing only Fuchs restorations.' Even so, it took Patrick a few goes to perfect the process because his German source hadn't thoroughly explained everything and it took time to refine the technique. Now, Art Wheels currently has three technicians working on the Fuchs alloys.

Piece de resistance to the side of the main workshop and reception area is the eye-catching line-up of Fuchs wheels, all presented in different colours, showcasing

Patrick's team's handiwork. We pass through into the wheel lab section, and he lifts a Fuchs onto the bench. He explains the process the wheels undergo, depending on the relevant build programme and finish required: 'This one has the race finish with the matte black background to the spokes

model of course has much wider rims; they are all nicely differentiated.'

Every wheel passes through a similar treatment process: 'We clean it first, and then check the balance and align it to make sure it is not buckled. If it is crooked we can straighten it, and, if there are any cracks,

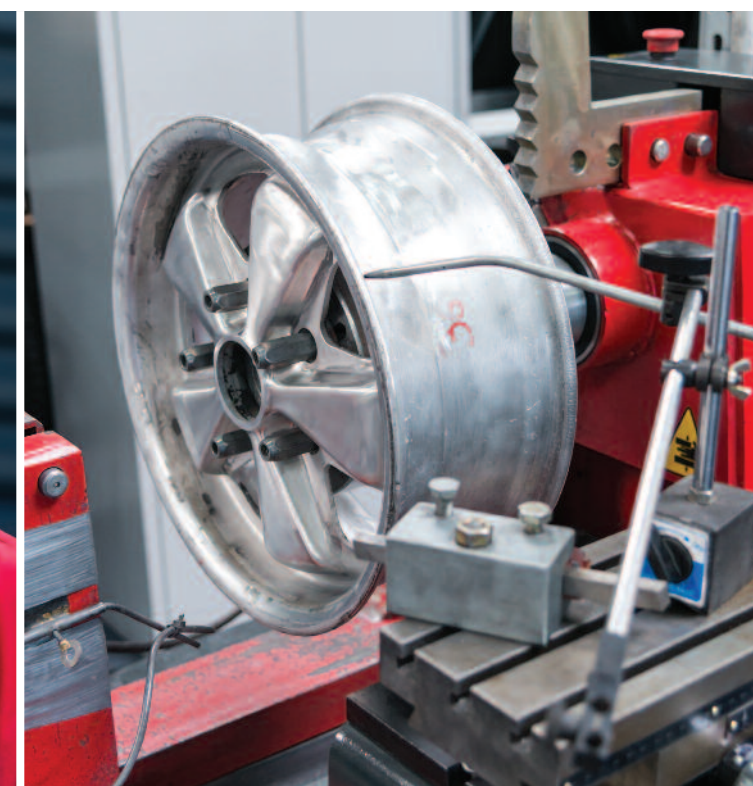
“ If you have one crack in the rim or a spoke we can make a weld ”

which are themselves shiny. The exterior of the rim is not only polished, it is anodised too.' He shows how to identify the age of a wheel by the stamping: 'This one is 6in wide by 15in diameter, and it's from June 1969, so it's for a 2.0-litre S, or a 'T' or an 'E'. Then we have the classic rims for the 2.2 and 2.4, and these are the rims for the 'F' model and 'G' model, and this finish is standard for an 'S' model, and the RSR

they would need refurbishment.' Some wheels have gone beyond the point of redemption. 'There is a point where a wheel is just so bad that you say, I'm sorry, I can't help this one: for example, if you have one crack in the rim or a spoke we can make a weld, but if there are two cracks we probably won't proceed. Sometimes there might be three or four cracks, and in that case, we certainly don't touch it.' He shows



Patrick Pugin identified a need for specialist Fuchs restorations. Right: Machinery was sourced from a retiring German Fuchs restorer



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Fuchs come in all shapes and sizes as witnessed by this early and late pair

A cracked rim like this can be repaired. Right: It's not all about the wheels. The Art Restoration side of Patrick's business handles complete classic Porsche restorations



WHEEL METRE GAIN

Here's a brake-neck (sic) history of Fuchs wheels. Designed by Porsche stylist Heinrich Klie and produced by Otto Fuchs in forged aluminium, their key attributes include strength, lightness and their open five-spoke design assists brake cooling. Fuchs wheels debuted on the 911S for the 1967 model year, and became standard fitment across the range in most markets in 1970. In original skinny 4.5in rim width they weighed 2.3kg (5.1lb) less than the standard steel wheels. Lightness allowed greater rim width at less cost to unsprung weight, and 5.5in rims were introduced for the '68 model year. Special 6-inch wide 'deep dish' style 15-inch Fuchs were made for the 1967 911R racecar, and this '6R' rim is extremely rare. By the time of the introduction of the 2.2-litre cars in 1970, Fuchs wheels were pretty much *de rigueur*. They tended to be 6in x 15in, though the 911T still used 5.5in x 15, while up to 1971, Sportomatics and hydropneumatic Es could be optioned with 14in and taller tyres for an easier ride. The 6in flat-dish Fuchs rims were introduced in March 1971. While the T reverted to chromed steel wheels for '70 and '71, the 6 x 15 Fuchs topped the bill for the 2.4-litre E and S in '72 and '73, and the less

expensive cast aluminium ATS "Cookie Cutter" alloys came on the scene in '73. That year, for the first time, the 911 appeared with differing wheel and tyre sizes front and rear: the 2.7 Carrera RS sported 6J front and 7J rear Fuchs rims with centres painted to match the body colour or graphics. With the arrival of the impact bumper cars in 1974, the Fuchs took on a different appearance: gone were the polished spokes, giving way to black centres and polished rims, a look adopted widely – though not totally – across the line-up. By 1975 all 911s were fitted with 6- and 7J x 15 Fuchs, universally black centred – unless, of course, the customer specified spokes painted to match the car's body colour. It was all change in 1978 with the launch of the SC: standard models came with ATS Cookie-cutters, though in certain markets the SC Sport could be fitted with Fuchs. In '84 the 3.2 Carrera was available with five-hole "telephone dial" wheels as well as Fuchs, and again, their spokes could be painted to match the colour of the car, which was particularly attractive in Club Sport and Anniversary hues. By the end of the decade the 964 was shod with 16in Design 90 or 17in Carrera Cup wheels, occasionally painted to match or just plain black.

us an RSR wheel that's been mangled in a race accident. It's potentially so valuable that they'll cut off the rim and weld on a fresh one.

The black finish is paint, not powder-coating; only the bare aluminium parts are

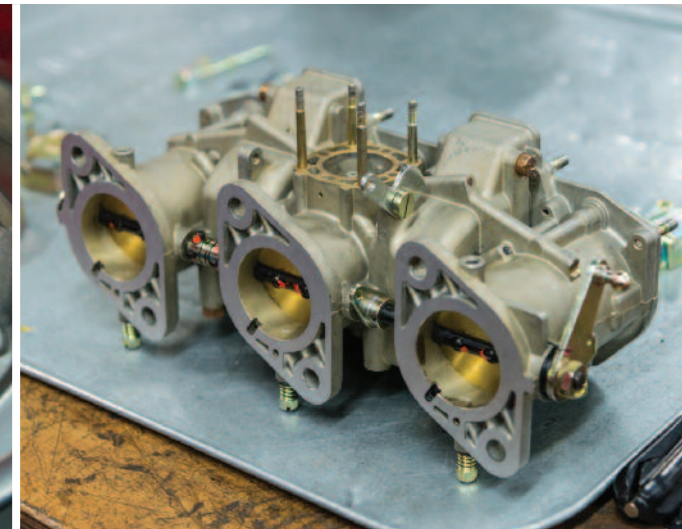
anodised. But in the general process they immerse all the wheels in a bath to anodise them after painting. 'Anodisation involves a nitric acid bath and an electric current, which causes oxidation of the surface of the metal. You can have coloured

anodising, but today we are reproducing the finish as it was originally, trying to be as close as possible to the original finish. When the wheels were originally produced it was an industrial process, but today, because we are dealing with them on an



More specialist machinery, this time to polish the outer rim. Patrick Pugin insists on a 'clean air' environment, with extractors to remove any contamination

Anodising is a chemical process involving a nitric acid bath and an electric current, which causes oxidation of the surface of the metal



individual basis we can make them better than they were in the past.'

The finished wheels look absolutely gorgeous, like confectionery in a sweet shop. The earliest Fuchs wheels, fitted from 1967 to 1970, are more sensitive to deformation than the version produced from '71; the flatter dished model is stronger, and Patrick also finds he has fewer balancing problems with the later wheel. 'The design of the wheel has changed, and because it is stronger we have less problems with balancing and geometry. Besides, you cannot work on the aesthetics if the wheel is not spinning true.' The offset between hub spokes and rim is slightly greater on the post-'71 wheels compared with the earlier versions, though probably the earlier wheel is prettier. Nothing gets the brush-off: I spot some ATS Cookie Cutters on a rack. 'Yes, we also handle Cookie Cutter wheels. Five years ago, nobody wanted to know about them, but today there is lots of interest. For example, in 1974 the 2.4E and S came out the factory with those, and now German owners want to have their car looking original, so Cookie Cutters are back in circulation.' They also refurbish 3.6 Turbo Speedlines and BBS split-rims, which have to be dismantled and treated in three sections.

'I can show you the process of Fuchs restoration. The first job is the stripping of the wheel; we use a sand-blasting system

to remove the paint on the wheel, so now we can check it to see if there are any cracks, and we put it on the balancing machine to check if there is a problem of it twisting.' In which case, the wheel is rotated on a hub and the encircling clamp exerts force on the buckled areas of the rim, effectively straightening it out. 'I have to check the wheel in all dimensions, side-to-side, back and front, and when I have assessed the deformation I can apply pressure in the appropriate direction. It's not easy, but we can do it. This is a very

you can see on this one we took out some metal here.'

Patrick is keen to stress that his team works in clean air: 'the German guy was working in such bad conditions, with no protection, no fresh air, so when I started up the business I wanted to do it in the right conditions with extractors installed. After stripping we take out all the major damage and corrosion with the grinding machine, removing metal, and if we need any welding we have to deepen the damaged area by 1- or 2mm to be sure there is no

“Today we can make them better than they were in the past”

special machine tool, sturdy too, and it's a good machine to start with, but actually it is not powerful enough for what I want to do. So, I have to buy a bigger one because that Fuchs aluminium is very strong. We heat the aluminium with this system, we heat it locally where the problem is, where we want to push on the rim. Sometimes it's due to the geometry of the wheel, so I have to modify the geometry, but sometimes you can have as much as 2mm distortion and that has a big influence on the balancing, so sometimes we take out some metal –

corrosion.' This is the first part of the actual restoration, and the operators use different types of grinding materials to apply to the metal and remove all the faults and blemishes. 'The polisher has a very aggressive surface and we start with a very aggressive material and when there is no more defect we apply thinner and thinner material to achieve a mirror shine, and after that we make the anodisation. When we weld the metal, we increase the structure of the aluminium, and afterwards when it's all polished to a mirror finish – like chrome –



With the Art Restoration and Art Wheels businesses running side-by-side, Patrick and his team have pretty much everything covered for classic Porsche restoration

you can't see those repairs.'

The polishing machine looks like something you might see in a shoe repair shop – but with somebody riding a bicycle, using the handlebars to manipulate the polisher head in and around the rim. He applies some polish on the disc and you

chemical process, and the protection it gives the wheel is like the original.' If a wheel is not absolutely perfect after treatment it is declared a "second choice", but that's not the end of the road. 'We have a lot of wheels here, and most of them belong to us, so we can sell them, and we

The final process is applying the colour to the area of the wheel inside the spokes. This is achieved by dunking the wheel – on its side, and very precisely – into a bathtub of paint. 'We lower the wheel into the bath so the paint goes up to just that level, so the spokes and the rim do not enter the paint, and it's the level of the painting that's making that characteristic pattern that highlights the five spokes. The process is simple, but getting the right result is difficult. I spent six months developing it, because you have problems with bubbles, runs, dust, and how the paint is going to cure because when it's anodised the paint can lift. Today I am the only one in Europe doing the paint dipping technique.' He's a busy man, then. Patrick and his team restore something like 50 wheels a month, and that means that, potentially, three more cars each week are rolling on as-new Fuchs wheels. Fox on the run. **PW**

“ Patrick and his team restore something like 50 wheels a month ”

can see it start to brighten up and transform the metal on the rotating wheel. 'We are polishing 20 wheels a day, so the preparation has to be good; you can spend three hours polishing and still have a bad result if the preparation of the surface is not good. The anodisation that follows is a

make a discount for a wheel with some "clouds" in the anodisation. We cannot say, "it's a perfect wheel," but it could be a spare. When we assess a restoration, if we have welding to do, we explain to our client what will be the likely result, and they give the go-ahead, or not.'



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