

As cool as Carbon

Exotic, expensive and undeniably cool, carbon fibre products not only look great but they are becoming increasingly available on the current range of BMW motorcycles. Once the preserve of expensive supercars and Formula One teams, this high-tech composite material is now finding a home in many different markets, thanks to its high tensile strength, low weight and low thermal expansion.

These features make the use of carbon fibre very popular in aerospace, civil engineering, the military, and especially the motorsports industry, where it can be found in a wide range of performance vehicles including sports cars and superbikes, as well as racing bicycle frames, powerboats and even safety helmets. Because this composite material is so pleasing to the eye, it is often used in the tuning and customising industry where the woven panels are left unpainted for maximum effect.



Of course, carbon fibre doesn't only look great, its use is becoming increasingly important in vehicle production in terms of weight savings, and therefore lower emissions, with a potential weight reduction of 50 per cent compared to steel or approximately 30 per cent in comparison to aluminium. Simple and instant weight savings for interchangeable parts then; but its production process is anything but simple.

BMW only uses PAN (polyacrylonitrile-based) high-quality fibres in the spinning process to create the precursor monofilament yarn, which is then 'carbonised' under high temperature (more than 1000 degrees Celsius) with the exclusion of air

oxygen so that the fibre yarn carbonises, rather than burns. For the carbonisation of the precursor yarn into carbon fibre, the yarn passes through several ovens set at different temperatures, and then runs through a 'sizing bath', which assures the perfect fibre-matrix adhesion needed for the lamination process. The yarn is then wound onto carbon fibre spools for further textile processes such as weaving or multiaxial production.

It's all incredibly complicated but the end result is an incredibly strong, yet flexible and lightweight material that has many uses and looks great. You'll see it on certain BMW sports cars such as the high-performance M3 and M6 models that use carbon fibre roofs that offer substantial weight savings over the standard items. And of course when carbon fibre was introduced into Formula One racing it revolutionised the sport, and just about everything on the F1 cars (except the engine) is now made of carbon fibre, resulting in stiffer, lighter and even faster cars.

Ultimately though, this amazing composite material is just a man-made fabric that comes on a roll and can be manipulated for use in a variety of different applications. Because its structures behave differently to steel or aluminium, it can be perfectly customised by BMW engineers to suit the performance of a particular component, whether it is flexibility in a certain direction, or high stiffness in another direction.

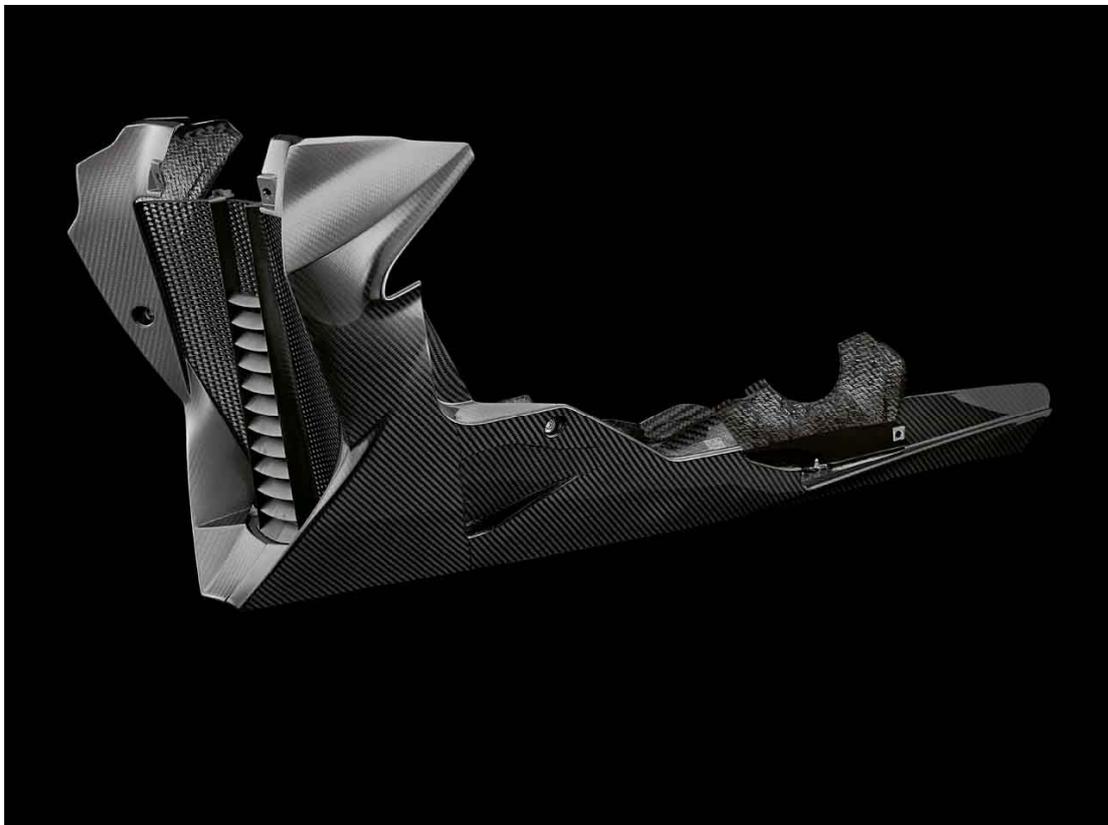
The jury is still out – in performance terms at least – when it comes to the use of carbon fibre in motorcycle sport. While some MotoGP bikes use carbon fibre frames and swing-arms to reduce weight, others remain unconvinced by the composite's benefits because it's harder to adjust and the way motorcycles behave while cornering have allowed riders and chassis engineers to make good use of the frame flex offered by metallic frame construction.



For series production motorcycles, such as the S 1000 RR and K 1300 R, a wide-range of carbon fibre High Performance parts have been designed so that owners can customise their own machines and give them an even more sporty and exclusive look. Naturally the HP carbon parts weigh less than the standard items they are designed to replace, but with a dry mass of just 183 kg, the S 1000 RR is one of the lightest machines in its class anyway, so weight reduction certainly won't be the main reason why riders buy these special accessories!

There is a wide choice of parts available, opening up enormous potential for owners to individualise their S 1000 RR. These include: HP Carbon front wheel cover; rear wheel cover; badge carrier; tank cover; tail-hump cover; chain guard; heel guard; and engine spoiler. BMW Motorrad is the only manufacturer to offer its carbon parts with a high-quality, three-coat, high-gloss paint finish, which is UV-resistant and offers outstanding impact resistance and protection against discolouration. With the exception of the HP Carbon heel guard, all parts come with fitting instructions and can be easily installed by owners.

According to Johann Sievers-Paulsen, who is one of the BMW Group's experts within this field, the synergy with the company's car division in terms of research and development has allowed BMW to develop and offer very high-quality, direct carbon fibre replacements for the standard plastic parts.



“BMW Motorrad has several highly skilled experts for carbon fibre structures, who are involved in the development process right from the beginning of the design phase of the individual components. There is also a lot of synergy with the automotive division and we are in continuous discussions with them. This means that our High Performance carbon fibre parts mostly have the same requirements as the exterior automotive parts, which results in extremely high quality and engineering levels.”

So, top grade, exclusive HP carbon-mounted parts are now available for bikes like the BMW S 1000 RR and the K 1300 R, thanks to a combination of in-house technical expertise and a desire to offer the highest levels of quality and individual levels of customisation. Just how far you go to personalise your machine is entirely up to you...

