CHOOSER BODYWORK

Crash replacement or trackday use, which type of bodywork should you go for? Here's what you need to know...

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SUZUKI DEALER

OE ROAD FAIRING

(SUZUKI GSX-R 1000 K5/6 FRONT COWL / TAIL UNIT)

- **£145.15 (FRONT COWL) £403.29 (TAIL UNIT)**
- **CONTACT: YOUR NEAREST SUZUKI DEALER WWW.SUZUKI-GB.CO.UK**

OE panels are made from ABS plastic as standard and are supplied fully painted from the factory. Panels will be 100 per cent matched for a direct fitment so no trimming/drilling should be required.

MOTO CC

AFTERMARKET ABS PLASTIC ROAD FAIRING

(SUZUKI GSX-R 1000 K5/6 FRONT COWL / TAIL UNIT)

- **£425 INC DELIVERY (FULL FAIRING SET)**
- **CONTACT: 0845 8685464 OR WWW.MOTOCC.CO.UK**

Free colour match service available, kits are made via injection moulding (although the K5/K6 panels pictured here have been compression moulded, purely used as an example to show the different production techniques). Fairings come with pre-drilled holes and inside paint/heat matting where needed and are intended as a direct replacement. Fitment is said to be 96-98 per cent within OE specs. They're cheaper than OE – for almost the same price as an OE tail unit you can buy a complete fairing set, but they are not as accurate.

ARD RACING

AFTERMARKET RACE/TRACKDAY FIBREGLASS FAIRING

(SUZUKI GSX-R 1000 K5/6 FRONT FAIRING)

- **£190 (£150 PLAIN WHITE)**
- **CONTACT: 0191 261 4579 WWW.ARDRACING.COM**

Hand-layed up CSM (chopped strand mat) 1.5 layer, 450gsm fibreglass race fairing which can be made to bespoke weight requirements depending upon use and needs (heavier tends to be more crash durable). Can be supplied in a coloured pigmented gel coat finish (as pictured) that runs all the way through so that scratches can be polished out easily. Woven roving manufacture also available.

CRESCENT SUZUKI

YOSHIMURA RACE FIBRE GLASS FAIRING

(SUZUKI GSX-R 1000 K5/6)

- **£621**
- **CONTACT: 01202 820 170 WWW.CRESCENT-SUZUKI.COM**

Handmade in Japan, this woven glass fibre 3-4mm thick race fairing is made to the same specifications as what the factory bikes would use, in glass fibre.

WHAT MAKES GOOD BODYWORK?

Fairings that are lightweight, durable with a certain amount of flexibility, have good weather/corrosion resistant properties, fit well, can be painted and treated easily, are as crash resistant as possible (i.e. doesn't explode into tiny pieces after a low impact tumble) and can be repaired (within reason).

WHAT MAKES OE PANELS SO GOOD?

OE panels are made from ABS (acrylonitrile butadiene styrene) plastic, a common thermoplastic perfect for making light, rigid moulded items like bodywork panels.

Proportionally, ABS make-up can vary from 15 to 35 per cent acrylonitrile, five to 30 per cent butadiene and 40 to 60 per cent styrene. The styrene gives the plastic a shiny, impregnable surface. The butadiene is a rubber-like substance that gives resilience, even at low temperatures.

The advantage of ABS is that it combines the strength and rigidity of the acrylonitrile and styrene with the toughness of the butadiene rubber. It's relatively easy to improve ABS plastic's impact resistance by increasing the proportions of polybutadiene in relation to the styrene and acrylonitrile. So by changing the amount of its components, ABS can be made in different grades. OE panels will use high-grade ABS plastic; reputable companies specialising in aftermarket ABS panels will also use good quality plastic*. ABS's final properties will also be influenced by its manufacturing process *(see injection and compression moulding)*. Moulding at high temperatures improves the gloss and heat resistance of the finished panel whereas using lower temperatures results in higher impact resistance and strength.

ABS's weather resistance ability can also be vastly improved by adding additives such as black pigments to it. Chemically ABS isn't affected by water, non-organic salts and acids. It can be treated with varnish, chromium plated or made thicker by a layer of acrylic or polyester that serve as a surface finish.

******The £200 full plastic kits available on the internet are not normally high-grade ABS – the plastic used is probably a poorly recycled and processed mix of different low-grade materials with no additives and using cheap compression moulding techniques that produce excess flashing (see compression moulding). The moulds used are typically less accurate and as a result the finished product might not fit too well and could be prone to cracking and brittleness.*

Injection Moulding

This is the most commonly used plastic moulding process for making parts from thermoplastic and thermosetting plastic materials. Plastic is placed into a heated chamber and melted. Then the melted plastic is injected through a nozzle into the mould cavity and once it is full, constant pressure is applied to allow for material shrinkage. The plastic then cools and hardens in the mould. To reduce the risk of weak spots using this process, the part to be made must have its thickness kept uniform throughout. Most OE and aftermarket plastic fairing kits are made like this.

Compression Moulding

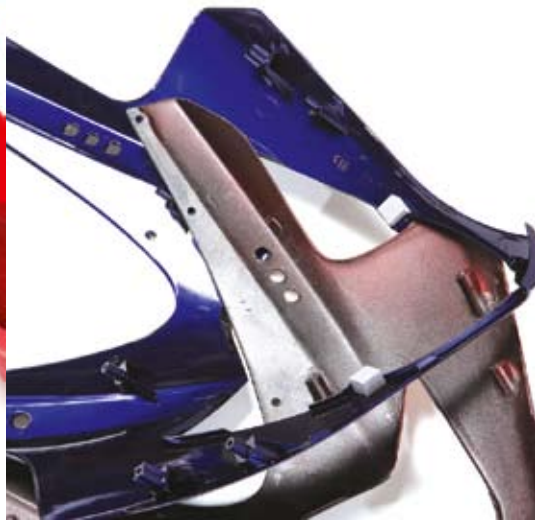
This is a high-volume, high pressure moulding method and is a lot cheaper than injection moulding. Not much material is wasted: good for working with expensive materials. The plastic (generally preheated) is put into a heated metal mould cavity and pressure is applied (normally via a hydraulic ram) to force the plastic into contact with all of the mould's areas. Heat and pressure are maintained until the plastic cures. One of the most common methods is sheet moulding compound (SMC), where the material is usually cut to conform to the mould's surface area and laid in sheets into the mould.

Disadvantages include varying product consistency and flashing issues (excess material attached to the moulded part which has to be removed.) This normally occurs along a mould's parting lines (where two or more parts of the mould meet), where material will leak into the space between the moulds. Cheap plastic toys often suffer from this (it ends up as a raised line around the outside of the item). Early aftermarket plastic fairing kits used this method.

Your bike made faster

Yoshimura use fibreglass woven roving to increase strength

Colour pigmented CSM fibreglass fairing has been hand layed-up



They may both be made out of ABS plastic, but the OE fairing (blue) makes a case for its higher cost through perfectly formed moulded mounting points and bevelled holes

FIBREGLASS

Fibre glass is material made from extremely fine fibres of glass. It is used as a reinforcing agent for many polymer products; the resulting composite material, properly known as glass-reinforced plastic (GRP), is normally referred to by the name of its reinforcing fibres (fibreglass).

The most commonly used type of fibreglass is mainly E-glass (alumino-borosilicate glass that is almost alkali-free). The glass can be in the form of a chopped strand mat (CSM) – where it's made of randomly oriented, small, cut lengths of fibre all bonded together – or woven roving. CSM is cheaper and easier to work with than woven roving, but woven has a uniform look that easily identifies fairing as 'race', plus its stiffness and strength can be more precisely controlled.

Thermosetting plastics are normally used for GRP production, usually polyester resin. The two materials (fibreglass and plastic) act together, effectively cancelling out the weaknesses of the other. Whereas plastic resins are strong in compressive loading and weak in tensile strength, fibreglasss are tensile-strong but have no compression strength. In areas of bodywork where tensile strength is needed (e.g. mounting points), glass can be specifically put in those places, and in the other areas the two materials can be used together. As a result, GRP is lightweight yet strong and has a weather resistant finish, perfect for race/trackday fairings.

Fibreglass hand lay-up

The resin is mixed with a catalyst to speed up the curing (hardening) process, before the mould is soaked with the mixture. Fibreglass sheets are placed over the mould and rolled down into it using varied sized rollers for all the different areas. More resin is applied and rollers are used to ensure no air bubbles are trapped between the mould and the fibreglass and that the resin soaks through all of the material. It must be done quickly before the resin starts to cure – faster/slower curing times are set by changing the amount of catalyst used.

CARBON FIBRE

Carbon fibre (CF) is a composite material made from embedding fibres of carbon in epoxy resin. In its simplest form the process involves laminating layers of fibres (usually as matting) with epoxy before curing.

Apart from its light weight, CF's main advantage is the fact that its fibres can be arranged in such a way as to suit the particular forces that affect a component (like a fairing panel), meaning that areas of weakness can be tuned out.

CF is expensive to use because the raw materials are complex and costly to fabricate, there's a fair amount of wastage, plus most of the performance benefits come from the items being hand-built (a skilled craftsman can fabricate CF to eliminate weak spots and work with individual requirements more easily).

Two common ways of producing CF are wet lay-up and pre-impregnated lay-up and both are used in making fairings.

Wet lay-up

This method can be used for either CF or fibreglass (plus resin), and it's cheaper and less labour-intensive than pre-preg.

Dry fibres are laid into a mould and resin is poured onto them. The resin is then brushed over the fibres, and is added in multiple layers until the desired thickness is achieved. If done incorrectly, the fibres can be saturated, adding extra weight and reducing stiffness and strength. Products made this way can suffer inconsistency as certain areas can be oversaturated while others might not receive a thick enough resin layer. Wet-lay CF is no stronger than fibreglass but looks good, so some people prefer wet-lay CF items (huggers, heel guards etc).

MORE OPTIONS

(based on Suzuki GSX-R 1000 K5/K6)

FIBREGLASS RACE/ TRACKDAY FAIRING

Moto 46
£229.99
Contact 0845 2054646
www.moto46.co.uk

Skidmarx
£260
Contact 01305 780808
www.skidmarx.co.uk

Race Products
£205.53
Contact 01673 842704
www.raceproducts.co.uk

MotoGP Ricambi
€310 (plus €35-€58 shipping)
Contact +39 333 3249929
www.motogpricambi.com

Crescent Suzuki
£278 (2-piece race fairing)
Contact 01202 820 170
www.crescent-suzuki.com

AFTERMARKET ROAD FAIRING (ABS PLASTIC)

Slick Fairings
£945 (full fairing set)
Contact 0800 043 4099
www.motorcycle-fairings.co.uk

Aftermarket Road Fairing (Fibreglass)

Skidmarx
£295 (standard white full fairing for K1/K2 – ten per cent surcharge applies for colour)
Contact: 01305 780808
www.skidmarx.co.uk

REPAIRS / PAINTWORK

Altamura Concepts
Contact 01276 61650
www.altamura.co.uk

Dream Machine
Contact 0115 973 6615
www.dream-machine.co.uk

Racepaint UK
Contact 01773 533072
www.racepaintuk.com

MRS Direct
Contact 0115 9447 666
www.mrsdirect.co.uk

Pre-Preg

This lay-up method creates stronger products than wet lay-up (typically 20-30 per cent stronger than wet material of the same thickness), but is much more expensive to do.

The carbon fibres are pre- impregnated with resin at the factory and rolled onto spools and frozen to stop them curing too quickly. Curing is achieved via an autoclave – this is also known as a 'dry' process. The CF composite is placed into the autoclave (essentially a big oven) and it effectively pressure cooks the fibres and solidifies the resin.

Pre-preg CF is quite difficult to paint as it has lots of tiny holes and the lacquer runs into these, but as pre-preg's value is in its increased strength and light weight, lacquering it takes away most of these benefits – use wet lay-up products if looks are more important than strength.

FITTING

As OE bodywork is made from original moulds that cost thousands of pounds to make, only OE panels will truly fit properly with no extra modifications being needed to fit them. Aftermarket bodywork will normally need some additional preparation prior to fitting as it has all been made from a mould of the original mould or from a panel. It's inevitable that some inaccuracies will occur the further you move away from the original mould.

Always measure twice, cut once. If you have a complete fairing set, always work from the top cowl down and loosely dry-fit all panels first to check where they line up, if there are any gaps (if so, are they even on both sides?), that there are no pressure points to rub paint off, that cables won't be snagged and to identify areas where trimming/drilling is required.

A good way to hang all the panels together without screwing everything in place with hard bolts first is to use number plate bolts; they are longer and softer than normal bolts and won't cause damage. Be patient – be prepared to spend time offering panels up repeatedly before cutting anything.

If trimming is needed, doing things by hand is always better as you can not only get a straighter edge (automatic tools can jump and skip over undulations in panel surfaces, causing damage), but you don't take too much material away in one go.

Good tools to use are different shaped metal files and a metal rasp that has half-moon cutting teeth. Ideally fairings should be unpainted as if trimming/drilling is needed it will damage the finish, although good aftermarket companies are confident that their panel fitment is pretty accurate and fitting is relatively easy to do.

REPAIR

OE panels are fairly straightforward to fix. In the case of plastic welding, the welding machine (like a complicated hairdyer with different sized nozzles), applies heat to the plastic and as it starts to melt, plastic rod (matched for size and material composition) is fed slowly into the crack to fill it. The skill lies in the operator using the correct nozzle, heat, pressure and flow rate to achieve a good repair.

By contrast, fibreglass is a lot messier to work with (fibre inhalation being a risk as well as the resin getting everywhere), and if the bodywork is badly damaged, it's often cheaper to buy a replacement track fairing and start again.

Repairs are possible, but one of the difficulties is where a damaged panel has contours, the fibreglass matting material is flat. So to put the contour back in, the material has to be built up in layers slowly to fill it in properly.

Carbon fibre can also be repaired but only if the weave hasn't been broken, as this compromises its structural strength. If the top gel coat or lacquer has been cracked then it can be flatted out and re-lacquered.