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TYPES OF WHEELS

Spoked Wheels

Spoked wheels are also called wire wheels. With a spoked wheel, the hub is suspended in the middle of the rim by spokes. Spokes are laced in a crisscross pattern from the hub to the rim. Each spoke is threaded on one end. The threaded end is screwed into a nipple that is attached to the rim.

Only the upper spokes support the weight of the motorcycle. The spokes must also support the braking forces that are placed on the brake rotors which are attached to the hubs. A hub may have only one brake rotor attached, or it may support two brake rotors – one on each side of the hub.

In addition to bearing the weight of the motorcycle, spokes must support the forces of acceleration. High performance bikes do not use spoked wheels because the forces of braking and acceleration are too much for spoked wheels to handle.

Spoked wheels are made out of aluminum or steel that has been chromed. Hubs are typically made of aluminum.

High performance bikes usually have dual front brakes and therefore have one brake rotor attached to each side of the front hub. Nearly all bikes have only one rear brake and therefore only one rear brake rotor.

Spoked rims absorb a certain amount of road shock and this has made them popular on motocross and off-road motorcycles. Motocross riders have experimented with cast wheels, but the shock from landing jumps was too severe. This is because there is no flex in a cast wheel to absorb shock. Spoked wheels are also popular on customized bikes because they have a vintage look to them.

Traditionally, most spoked wheels have required a tube to be used with the tire. If there is no tube, air can escape around the spoke nipples and the

tire would not hold air pressure. However, rim straps have been designed to mitigate air leakage and some spoked rims have been able to use tubeless tires.

Spoked wheels must have cross patterns in the spoke configuration for rigidity. The more the spokes cross, the more rigid the wheel will be. With radially spoked wheels, the spokes do not cross. Radially spoked wheels are too weak for use on the street unless they are made with extremely thick spokes. The spokes on radial wheels fit for street use look more like 3/8" inch rods than traditional thinner spokes.



Spoke wheels have the classic look but are typically not used in production motorcycles.

Cast Wheels

Cast aluminum rims are the most common rims on street bikes, high performance sport bikes and sport touring bikes. They are cost effective to manufacture because the rim, spokes and hub are all cast as one single

piece. The rim, spokes and hub are not separate parts that need to be assembled.

Cast wheels made from very light forged magnesium alloys, or forged aluminum alloys, are preferred in motorcycle racing. The weight savings is substantial and this allows the wheels to “spin-up” quickly, which results in faster acceleration. Marchesini is the most well-known builder of forged aluminum wheels for sport/racing bikes. These wheels come in 16 ½ inch and 17 inch diameters. Marchesini also makes cast magnesium wheels.



Cast aluminum wheels are the most common and cost effective to produce.

Although magnesium wheels are lighter than aluminum, they are more expensive than aluminum wheels, and so most racers prefer forged aluminum alloy rims which are cheaper to replace if damaged. Magnesium wheels corrode easier than aluminum and are not as durable as aluminum wheels over the long haul. The wheels referred to as “mag” wheels refer to magnesium.

The entire wheel assembly of rims, tires and brakes make up the “unsprung weight” of the motorcycle. The word “unsprung” refers to the fact that the wheels are not isolated from road shock by “springs” such as shock absorbers, as is the rest of the bike.

The lighter the unsprung weight, the quicker the turning and handling the bike will have – especially on a race track. The rider will be able to lean the bike over quicker in a turn and also get it upright quicker. This is because the lighter spinning weight of the wheels causes less of a gyroscopic effect. The gyroscopic effect of heavy rims and tires makes it difficult for bikes to turn because the rider must fight the gyroscopic effect when turning the bike. Basically, the bike just wants to continue to go straight. It does not want to turn.



CNC machines can be programmed to produce billet aluminum wheels with exotic designs.

Lower unsprung weight influences the effect that weight has on acceleration. Every one-pound of unsprung weight that is reduced, is the

equivalent of approximately 2 pounds of weight reduction elsewhere on the bike.

Lighter unsprung weight allows the bike to accelerate faster. To make a comparison, some custom Harleys are built with a 300mm rear wheel which is very heavy, wide and cumbersome. Bikes with these wheels suffer a twenty horsepower loss due to the amount of power it takes to accelerate and then keep this kind of wheel turning. This is why much larger aftermarket engines are required to push bikes that use these heavy wheels.

Stamped Wheels

Stamped wheels are made from aluminum, and the rim, spokes, and hubs are made as separate components. They are then assembled together - usually with large pin-like rivets. There are normally three, five or seven aluminum spokes in stamped wheels. Stamped wheels are cheaper to produce than cast wheels and are very common on standard bikes.

Carbon Fiber Wheels

Carbon fiber wheels offer the ultimate in lightweight and stiffness for high performance motorcycle racing or track days. Like all wheels, carbon fiber wheels must pass both U.S. DOT (Dept. of Transportation) standards and tough TUV (Technical Inspection Association) standards in Europe before they are able to be sold to the public in the U.S. and Europe.

Wheel Weight Comparisons

The following are some approximate wheel weights in pounds without adding in the weight of the brake rotors or brake calipers.

Imagine the weight of a five-pound bag of sugar, and that is the approximate weight difference between a stock cast aluminum wheel and a carbon fiber wheel. It is a huge amount of weight to shed from wheels, and racers will attest to the fact that it takes much less effort to get their motorcycle around corners due to the lessening of the gyroscopic forces.