



The Difference Between Radial and Bias Tyres.

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Introduction.

In one of our previous white papers, we've talked about how to build a tyre. During the tyre carcass building phase, we encountered two types of construction methods: radial and bias/diagonal. In this white paper, we are taking a closer look at the differences of these two construction methods.

This white paper will help you make the choice between these two tyre construction types.

This choice is one of the fundamental decisions to make when you're selecting your tyres. It's not just a matter of preference; the choice between these two construction methods can significantly impact your driving experience, safety, and even fuel efficiency. In this white paper, we aim to shed a light on the key differences between radial and bias tyres.

Understanding the Construction Methods.

Before delving into the specifics of radial and bias tyres, it's crucial to have a basic understanding of their construction methods. The layers of fabric cord plies are constructed differently in these tyres, which is the main difference between radial and bias tyres.

Radial Tyres: Revolutionising the Tyre Industry

Radial tyres represent a significant advancement in tyre technology. They feature a construction method where the layers of fabric cord plies run radially from the centre of the tyre out to the edges. This design allows for better flexibility and a consistent and wide contact with the road surface, which is one of their distinctive features. Radial tyres are known for their excellent grip, lower rolling resistance, and superior performance at high speeds.

Bias Tyres: A Trusted Classic

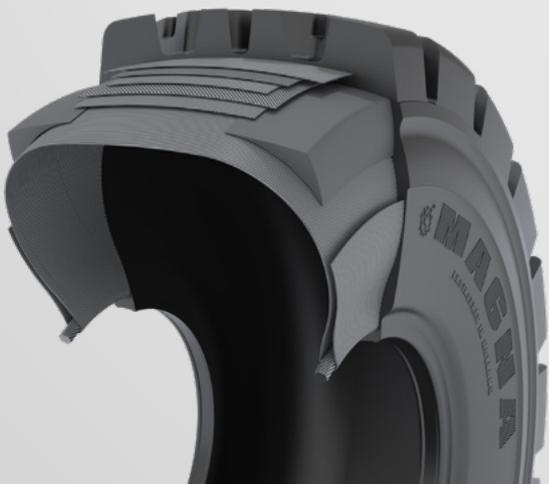
Bias tyres, on the other hand, have been a staple in the tyre industry for decades. These tyres are also known as diagonal tyres or cross ply tyres.

They are constructed with layers of fabric cord plies that crisscross at an angle to the direction of travel. This construction method is still favourable for particular applications. These tyres are often more robust and resistant to punctures, making them suitable for heavy-duty and off-road applications.

How To: Know Which Tyre Construction Type You Have

If you'd like to know which tyre construction type you currently have on your vehicle, you just have to check the sidewall of your tyre. Manufacturers often include information about the tyre's construction as a description. You should be able to see "Radial" or "Bias" marked in the sidewall. If this is not the case, the tyre size will always show you which construction type you have. Radial tyres are recognised with an "R" between the width and the rim size, while bias tyres are recognised with a "-" in between. Note that solid tyres also use the same recognition as bias tyres in the size notation.

Radial



Bias



Key Differences Between Radial and Bias Tyres.

Now that we have a grasp of the basic construction methods, let's delve into the primary differences between radial and bias tyres. These differences encompass various aspects, including performance, durability, and traction. See the table below for a brief summary. Below the table, you will find a more detailed explanation on each topic.

Radial tyres

Ideal for high-speed driving and everyday road use

Smoother and more comfortable ride

Traction and grip in both wet and dry conditions

Enhanced safety and handling/turning

Lower rolling resistance

Stability at high speeds and during turns

Strong for everyday road use

Durable for everyday road use

Less heat generation when in use

More expensive to manufacture

Reduced risk of accidents during cornering and manoeuvring

Suitable for both regular road driving and high-performance vehicles

Bias tyres

Ideal for heavy duty and off-the-road use

Slightly firmer ride

Traction in off-road and rough terrain situations

Enhanced strength and puncture resistance

Higher rolling resistance

Stability for heavy duty and off-road applications

Added strength, robustness and puncture resistance

Durable for heavy duty applications

More heat generation when in use

Less expensive to manufacture

Reduced risk of failures during demanding applications

Made for rough terrains and to withstand impacts so that vehicles remain in control

Radial vs Bias.



Ride Comfort

Radial tyres provide a smoother ride because of their flexible sidewalls, absorbing road flaws better than bias tyres. While bias-ply tyres are good for heavy loads and off-road due to stiffer sidewalls, they might be less comfortable on paved roads.



Traction and Grip

Radial tyres offer superior traction and grip, with consistent road contact, making them ideal for high-speed and everyday use. Bias tyres provide great traction in off-road conditions and are best for low-speed driving, with grip decreasing at higher speeds.



Strength

Radial tyres are strong for regular road use, but bias tyres, with their diagonal ply construction and stiffer sidewalls, excel in durability and puncture resistance, making them ideal for heavy-duty vehicles.



Durability

Radial tyres are typically very durable for everyday road use. Bias tyres are known for their robustness and resistance to punctures, which also makes them durable. Both tyres are durable for the purpose they are made for.



Fuel Efficiency

Radial tyres offer lower rolling resistance and better fuel efficiency due to reduced road friction. Bias tyres have higher rolling resistance but are favoured where strength and puncture resistance are vital.



Heat Generation

Radial tyres generate less heat during operation due to their flexible sidewalls and reduced internal friction. Bias tyres may produce more heat when in use, but bias tyres are used in settings that prioritise stability and strength over heat dissipation.



Price

Radial tyres are generally more expensive to manufacture, and as a result, they tend to have a higher initial purchase cost compared to bias-ply tyres. Bias tyres are typically more budget-friendly and are a cost-effective option for certain applications.



Stability

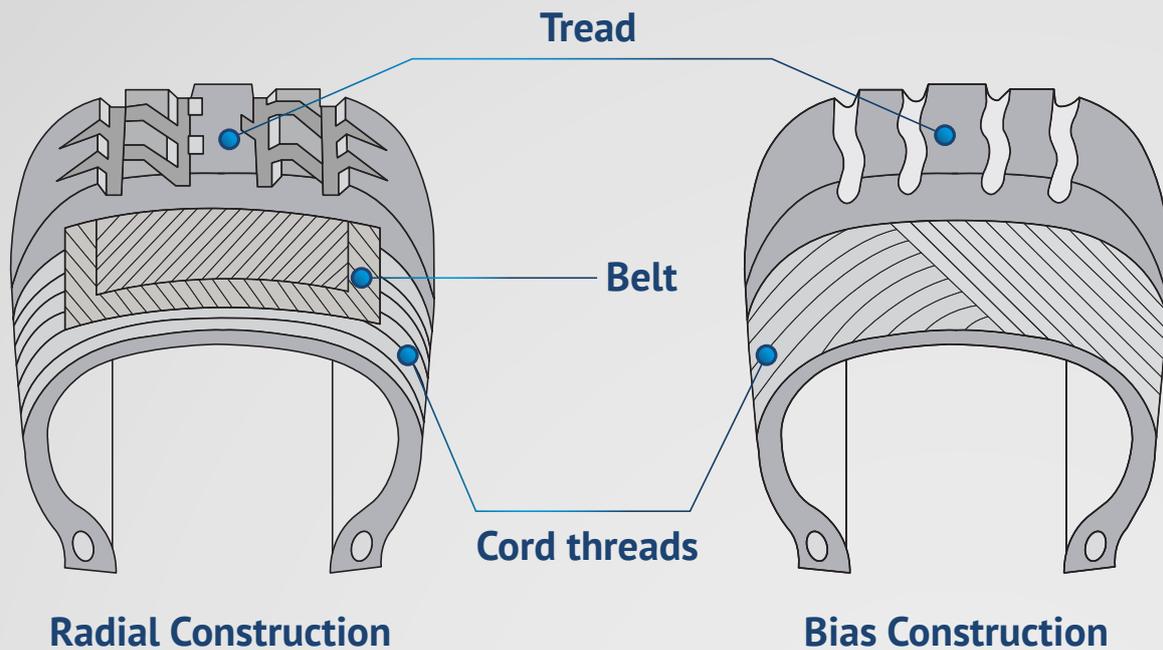
Radial tyres provide stability at high speeds and turns, suitable for regular and high-performance driving. Bias tyres, with their stronger sidewalls, excel in stability for heavy-duty and off-road use, ensuring vehicles remain stable on rough terrains.



Safety

Radial tyres provide grip and stability during cornering and manoeuvring, reducing the risks of accidents. Bias tyres focus on strength and durability, reducing the risk of failures in demanding applications.





When to Choose Radial or Bias Tyres.

Selecting the right tyre isn't solely about understanding their construction and key differences; it's also about knowing when to use each type. When it comes to choosing between radial and bias tyres, the decision largely depends on your specific needs and application.

For instance, if you're a casual driver primarily using your vehicle for daily commuting, radial tyres might be the ideal choice. Their superior grip and fuel efficiency make them a suitable option for urban driving. However, if your work involves heavy hauling or off-road adventures, bias tyres have their own merits. Their robust construction and resistance to

punctures make them a reliable choice for rugged terrains and heavy duty applications.

Tyres are the sole point of contact between your vehicle and the road. Making an informed choice can make a significant difference in terms of safety and performance. Take the time to assess your driving needs, and don't hesitate to consult with our tyre experts if you're unsure. Your journey begins with the right tyres beneath you.

Conclusion.

In conclusion, the choice between radial and bias tyres isn't a one-size-fits-all decision. It's crucial to consider your specific needs and application when selecting the most suitable tyre for your vehicle. Radial tyres offer high-speed performance and fuel efficiency, while bias tyres excel in rugged terrains and heavy-duty applications. Remember, your tyre choice can impact your safety and driving experience. It's not just about rubber hitting the road; it's about choosing the right rubber for your journey.

We hope you find this white paper to be informative and helpful in your future tyre choices.



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