

# What You Need to Know About EV Tires

HOW THEY'RE DESIGNED,  
HOW TO SELL THEM  
AND MORE



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# EVs are here to stay – and so are EV tires

HERE'S WHAT YOU NEED TO KNOW

By **Mike Manges**

**E**lectric vehicles (EVs), as a concept, are not new. There were EVs on the road in the 19th century. But never before have we seen such a strong, sustained push for these vehicles.

Government mandates, automobile manufacturer investment and purchase incentives will ensure that EVs, as a percentage of the North American car parc, will continue to grow.

Regardless of where you live and work, you will see more EVs at your shop as time goes on. There's never been a better time to learn about the tires these vehicles require.

And that's the purpose of this special e-book from MTD.

First, we'll ask the kick-off question, "Do electric vehicles always require EV tires?" I think you'll be surprised by what tire manufacturers and suppliers have to say, starting on page 4.

It's also well-known that EVs are heavier and generate more torque than their more common, internal combustion engine-powered counterparts. Driving range also remains a big concern of EV owners, who enjoy the quiet ride these vehicles provide.

With all that in mind, how do EVs impact tire design? Starting on page 8, tire manufacturers discuss how they work to juggle weight, torque, range and noise when formulating and building tires for EVs applications.

So now you've made the commitment to stock and sell replacement tires for EVs. What's the most important thing to remember when interacting with EV owners? And how do you sell tires for EVs effectively? Tire manufacturers and suppliers provide answers, starting on page 12.

"The EV owner is a very different type of buyer than the regular car owner," says Ron Dolan, president of Sailun Tire Americas. "They have figured out what's important to them."

This article will give you a much better understanding of how installation of the correct replacement tire can preserve – and even enhance – EV performance.

Nobody else covers tires for EV applications to the extent that MTD does. And we're pleased to share what we've learned with you – exclusively through this e-book. Enjoy! ■

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# Do electric vehicles always require EV tires?

THE ANSWER ISN'T AS CLEAR-CUT AS YOU MIGHT THINK

“There will be EV owners who prefer tires that were specifically designed for their vehicle if their driving habits align with those tires’ main performance attributes,” says Tsuyoshi Johnson, product manager, PCR tires, Falken Tires, Sumitomo Rubber North America Inc.

Photo: Sumitomo Rubber North America Inc.

By **Mike Manges**

**D**o electric vehicles (EVs) require tires that are specifically designed and built for EV applications or can existing tires with the correct attributes perform just as well on EVs?

It’s a question that’s on the minds of many tire dealers and consumers. In this MTD exclusive, tire manufacturers and suppliers weigh in and explain why. (Hint: it’s complicated.)

**Brandon Stotsenburg, vice president, automotive, American Kenda Rubber Industrial Co. Ltd.:** Vehicle application specifics determine the answer to this question, with some specific consumer preferences or needs further defining the answer. Specifically, the following application elements are the drivers in this decision:

**Load/heavier weight.** Based on the weight of the vehicle, primarily affected by the bat-

tery, this may require a tire with a higher rating, including XL or HL for non-LT designations. This also affects the expected wear of the tire.

**Torque.** The higher performance and torque of most EVs requires V- or W-rated tires that affect the wear of tires on EV applications. To improve the grip needed from stronger initial acceleration and higher output, this may require both mechanical and compounding changes for the tires.

**Noise reduction.** As EVs are inherently quieter than internal combustion engine (ICE) vehicles, tire noise from non-EV tires will be more noticeable. There are noise reduction technologies available to improve this issue, but it does require potentially more costly changes to the tire. This issue is important for most consumers, particularly in initial replacement cycles

**Rolling resistance.** EV range is affected by the rolling resistance of the tire. There are trade-offs to offering enhanced rolling resistance, which may affect wear.

**Dry/wet/winter traction and braking.** Currently, many EV applications are provided with tires that have limitations related to four-season performance. Depending on the application, summer performance has been prioritized. Many consumers require four-season capability.

As always, the load and speed rating requirement as defined by the vehicle application cannot be compromised. The other elements likely affect performance and benefits that consumers need to understand relative to trade-offs. The most obvious one that everyone is seeing relates to wear, as most EV tires currently have shorter expected wear primarily due to the vehicle design and use but also related to

the design decisions from the tire manufacturer or vehicle manufacturer.

Although Kenda is not currently offering EV options in North America, we are accelerating the analysis in the rapidly evolving market. Kenda is developing the technologies to enable EV tire designs that balance the trade-offs to support the vehicle application requirements.

**Steven Liu, vice president, product development, proprietary brands, American Tire Distributors Inc.:** The short answer is yes — you can put regular tires with the correct specs (example: load index) on EVs and (they) will perform from a safety standpoint. However, from the performance attribute aspect, regular, ICE car tires on EVs are likely to produce reduced mileage/tread life and higher noise level versus an EV-designated tire.

**Travis Roffler, director of marketing, Continental Tire the Americas LLC:** I can only speak for Continental products, but in simple terms, no — as long as the proper load capacity restrictions are observed. All Continental tire product lines are EV-ready and (are) designed to meet consumer needs, whether they drive an EV or ICE vehicle.

While tire and vehicle efficiency can be more top of mind for an electric vehicle or hybrid vehicle customer, these needs exist similarly for vehicles with combustion engines. As a result, Continental ensures a high level of efficiency, as well as long tread life and a high level of grip and comfort.

**David Poling, director of tire development and product marketing, Giti Tire (USA) Ltd.:** The answer is yes and no. Although EVs are designed around specific requirements and have attributes that differ from some vehicles, the requirements of the tires are still the same — to support the load of the vehicle and provide traction to transfer the car's power to the road. In that sense, any tire that meets these requirements can be used on EVs.

However, things are never as simple as they seem. Vehicle weight is generally higher for EVs due mainly to the battery pack weight, which can increase the weight by over 20%. Since tires are specified through industry standard guidelines to meet certain load requirements, there is really no difference between the tire requirements of an EV versus ICE vehicle. This excludes the new standard of tires designated as high load (HL), which must be designed

to carry higher loads and is an evolving and separate discussion since at this time they are an insignificant volume. The massive amounts of horsepower and torque generated by EVs far exceed their ICE counterparts. However, most EVs have advanced systems to properly manage and deliver the horsepower and torque to the wheels. But this doesn't mean that the system can't deliver high levels of torque.

would experience similar percentage decreases in their fuel economy (ICE) or range (EV) with a standard replacement tire.

The issue is the sensitivity of people to the vehicle range of an EV. So yes — a regular replacement tire can be used with the understanding that the range will decrease depending on the tire. A replacement tire can be fitted to an EV and perform well, with the tradeoffs



**“While tire and vehicle efficiency can be more top of mind for an electric vehicle or hybrid vehicle customer, these needs exist similarly for vehicles with combustion engines,” says Travis Roffler, director of marketing, Continental Tire the Americas LLC. Proper load capacity restrictions must always be observed, he adds.**

Photo: Continental Tire the Americas LLC

Noise is a critical component for tires fitted to EVs, (which) are more sensitive to tire noise due to several factors, such as no combustion engine noise and vehicle platforms that may have less ability to dampen out noise. Some OE tires come with a foam ring inside of them, but this only reduces noise around a small frequency spectrum. A well-designed replacement tire without the foam can deliver similar low noise results that many times will be indistinguishable to most consumers.

The range of the vehicle will be influenced by the energy efficiency of a tire — commonly referred to as the rolling resistance. The tire designed as OE on the vehicle will generally provide the range specified by the OEM. But this range comes at a trade-off to other tire performance attributes — generally treadwear. This is an identical situation that consumers face with ICE vehicles as OEMs require efficient tires in order to achieve government CAFE requirements. Consumers

previously listed. If the consumer's focus is vehicle range, then a standard replacement tire that is designed for long mileage will not deliver a similar range to the OE tire. Giti has the technology to design highly efficient tires, as we do for many OEMs around the world, but in North America, most consumers have opted for higher mileage over energy efficiency and that is what we have been focused on in the replacement market.

The key to success in the EV market will be developing the proper strategy to best suit the needs of consumers.

**Dave Reese, vice president, product development, Americas, Goodyear Tire & Rubber Co.:** While technically non-EV-specific tires may fit select electric vehicles, not all are engineered to address performance needs that are specific to EVs and therefore, would likely not provide the driver with the same driving experience traditionally expected.

The added weight and torque associated with EVs can impact several factors when it comes to tire performance — most importantly, load capacity, treadwear and vehicle range. In addition, noise from the road is often more noticeable when considering the quiet ride usually found with EVs. Goodyear is developing many products for commercial, consumer and off-highway segments that are equipped for the demanding needs of electric vehicles and balance the performance requirements desired from a growing audience of adopters.

**Moonki Cho, product manager, Hankook Tire America Corp.:** EVs require tires developed specifically for this vehicle type as there are key technical demands that an EV places on its tires — heavier weight, battery efficiency, road noise and traction.

EVs have heavier lithium-ion battery packs that can add 10% to 20% more weight and stress to load-bearing components across the chassis compared to their ICE-powered equivalent. The increased weight of EVs causes tires to wear out approximately 20% faster than ICE vehicles. To account for this additional weight, an EV tire must be built with new materials, such as a new tread compound or a reinforcement belt applied with Aramid fiber. EV tires are designed to bear the heavy weight of an EV, as well as extend tire life in a more sustainable way.

An EV must maximize its battery life and a key component of this is reducing rolling resistance. A more rigid tread pattern and



**“EVs do not require specific tires,” says Russell Shepherd, technical communications director, Michelin North America Inc. “As with all vehicles, Michelin’s first recommendation is the OE tire designed for the specific vehicle.”**

Photo: Michelin North America Inc.

prominent center section can compensate for weight distribution and higher friction contact point with the road, providing a more streamlined, efficient design — and thus lower rolling resistance to increase an EV’s battery range.

As the car’s powertrain changes from engine to electric motor, the cabin noise inside EVs can be noticeably louder than in ICE vehicles. EV tires are designed to reduce this noise. Knurling technology inside the tire grooves reduces tread pattern noise, while an absorbing foam material inside the tire helps further reduce resonance.

With a high instant torque, EVs provide ultimate power delivery. That means EV

tires need improved traction, steering and braking performance to handle the vehicle’s output and high acceleration.

Our iON product portfolio is tailored for high-end electric vehicles.

**Walter Chen, product planning specialist, Maxxis International-USA:**

Although not required, using tires specifically developed for EV applications is recommended. These tires are designed to handle the weight of the battery pack, reduce noise and increase driving range.

Ultra-high performance EV tires are capable of handling the heavier vehicle-weight, electric motor high-torque output and provide excellent cornering grip. Grand touring EV tires prioritize comfort, range, noise reduction and longer tread wear. Maxxis’ Victra Sport EV, a UHP summer tire, has a footprint shape that is optimized for the higher inflation pressure of EVs. If the tire’s footprint is not ideal, tread wear and performance can be negatively affected.

**Russell Shepherd, technical communications director, Michelin North America Inc.:** EVs do not require specific tires. As with all vehicles, Michelin’s first recommendation is the OE tire designed for the vehicle.

However, many consumers find that other tires in the market provide a balance of performance for their needs and driving styles. Even in the case of EVs, this is true and perfectly acceptable, as long as the tire size and attributes — such as load index — are respected.



**“EVs require tires developed specifically for this vehicle type as there are key technical demands that an EV places on its tires — heavier weight, battery efficiency, road noise, and traction,” says Moonki Cho, product manager, Hankook Tire America Corp.**

Photo: Hankook Tire America Corp.

A very common example is the use of winter tires on electric vehicles, in locations where there are significant winter accumulations or due to regulations. Another example can be seen with consumers who choose an all-season tire compared to the summer tires which come OE on certain EVs.

**Aaron Neumann, product development manager, Nexen Tire America Inc.:** The OE tires on EVs are specifically designed to meet the car manufacturer's targets. Normally, they are looking for the lowest rolling resistance so they can get the range as high as possible and be competitive in the wider EV market. But we also have to watch treadwear and noise very closely. EVs are heavier and have more torque, which creates more tire wear.

When an EV owner comes in for their first (tire) change, they can put on a suitable replacement tire of their choice. But they should be prepared to see a drop in range because most likely the replacement tire will have higher rolling resistance and there could be other trade-offs in handling and comfort, as well. On the positive side, they may get longer tread life with the replacement tire.



**"Many tiremakers are introducing dedicated EV tires that are adept at meeting the demands of electric vehicles and the needs of drivers,"** says Steve Bourassa, director of products, Nokian Tyres Inc.

Photo: Nokian Tyres Inc.



**"Pirelli advocates putting EV tires on EVs because those tires have been designed for the attributes of an EV,"** says Ian Coke, chief technology officer, Pirelli Tire North America Inc.

Photo: Pirelli Tire North America Inc.

**Ian Coke, chief technology officer, Pirelli Tire North America Inc.:** Pirelli advocates putting EV tires on EVs because those tires have been designed for the attributes of an EV. If you put a higher rolling resistance tire on that vehicle, you will lose range. We know that. And you would never put a tire that has an incorrect load rating on a heavier vehicle.

If you put the wrong tire on an EV, you will see the difference.

One of the biggest things we are seeing in the EV world is that because of the load and higher amount of torque, the wear rate increases quite dramatically. EVs tend to eat tires. As EVs become normal and the majority of the market, it is necessary to write 'EV' on the sidewall because these tires are developed to cope with rolling resistance requirements and heavier loads. By definition, we design tires to cope with all of those attributes. But an ICE vehicle doesn't necessarily have all the requirements of an EV.

The market is going EV. It's inevitable now. And it's not just the front end that's been pushed along, but also the back end. The EV world moves much faster than the ICE world. It's the biggest revolution in the tire industry since (the invention of) the radial.

**Steve Bourassa, director of products, Nokian Tyres Inc.:** Many tiremakers, including Nokian, are introducing dedicated EV tires that are adept at meeting the demands of electric vehicles and the needs of drivers. Those needs include a sturdy structure built to withstand the added weight and torque of EVs; technology aimed at minimizing cabin

noise; and low-rolling-resistance rubber compounds that increase range. Our EV-specific winter tires, the Nokian Hakkapeliitta 10 EV and R5 EV, were tailored to acutely meet those specific demands. There is a segment of drivers within the EV market that values these tailored benefits, such as added efficiency and range.

However, it is certainly possible for already-existing tires to meet these needs. As a Scandinavian company that makes tires in an area of the world where EVs are very popular, we have factored the needs of EV drivers into our product development process for several years. We formulate our rubber compounds to maximize comfort and efficiency. More than 90% of our tires are in the lowest categories of rolling resistance. We construct our tires to withstand heavier loads.

**Jack McClure, segment manager, PLT, Sailun Tire Americas:** Although traditional tires with correct attributes and specifications can be used on EVs, there are many benefits when fitting an electric vehicle with EV-specific tires. This is a similar discussion to the old debate of choosing between dedicated winter tires versus all-season tires. If you are looking for the best performance and driving experience, the answer is yes — go with winter tires. Ideally, the answer should also be yes — go with EV-specific tires if you want to get the most out of your electric vehicle. When roads are covered with snow and ice, winter tires are appreciated by those that have them and the same applies to EV drivers with dedicated EV tires.

Overall, every car, crossover, truck or SUV needs to have tires with the correct load index, speed rating, etc., and all traditional tires can be sourced to meet those basic requirements for an EV, too. However, EVs have major factors to consider when it comes to choosing tires, such as additional weight, additional torque and the fact that EV drivers want to avoid unwanted road noise from tires as they have nearly silent operation. EV tires help address those needs and in the instance of Sailun ERANGE EV tires, they have been specifically designed, constructed and tested for EV applications.

As more and more vehicle manufacturers offer additional electric car, truck and SUV options, the need for tires that specifically enhance EV performance, help increase range and also deliver a quiet and comfortable driver experience has never been greater.

**Tsuyoshi Johnson, product manager, PCR tires, Falken Tires, Sumitomo Rubber North America Inc.:** As long as a tire meets the standard criteria (load index, speed rating, etc.) for a vehicle, previously existing tires will provide the basic services they provide for non-EV vehicles. It's when you ask vehicle owners what they expect from a set of tires that you should consider whether certain products can deliver on their expectations.

Every driver has their own set of priorities when it comes to tire expectations. This was true before EVs and with the introduction of EVs comes a new set of expectations. Whether their main priority is a quiet ride, maximizing range, better wear characteristics to hold up to the immediate torque output of EVs or a balance of all the above — (this) will determine if a tire will meet expectations. It all really comes down to personal preference.

So in short, no — EVs don't require tires that were specifically designed and manufactured for EV applications. However, there will be EV owners who prefer tires that were specifically designed for their vehicle if their driving habits align with those tires' main performance attributes.

**Mike Park, assistant director of marketing, brand division, Tireco:** EVs are heavier and have more torque than vehicles powered by internal combustion engines, so there's more pressure being put on the tires. EVs are quiet and their range can be impacted by the tire's rolling resistance. In theory, EVs require a quiet, low rolling resistance tire that doesn't compromise performance when it's driven on heavier vehicles with more torque, but they do not require a specific EV tire.

The EV market is growing fast, but the total market volume is still relatively small and there are very few tire manufacturers that have developed EV-specific tires. For now, having the right sizes, load indexes and speed applications that meet the EV OE specs is most important.

**Joaquin Gonzalez Jr., president, Tire Group International LLC:** EVs as a specialty car segment have their uniqueness. For instance, because of EVs' heavy battery weight, they require tires with higher UTQG and stronger sidewalls. With the lack of special tire designs to match the launch of the EVs, auto manufacturers are currently using existing tires compatible with safety requirements as a quick fix. For example, the Tesla Model 3

is using Michelin Pilot Sport all-season tire with 540 AA A and the Bridgestone Potenza Sport 700 AA A as its OE tire.

However, since last year, more and more tire manufacturers have launched budget EV specialty tires with 600 AA ratings. Going forward, with the standardization of EV tire requirements, the EV auto manufacturers would be more inclined to use EV specialty tires as their standard OE tires. They are currently waiting for the major brand manufacturers to launch new product lines for the EV space. Therefore, we can reasonably predict

ICE counterparts because of the massive batteries that power them. EVs accelerate faster and have more torque, leading to faster wear on conventional tires. It is still common to see 25% faster wear on tires designed for EVs than comparable ICE vehicles with conventional tires.

**Chris Tolbert, director of sales, Trimax Tire Corp.:** The big three challenges are vehicle weight, tire noise and rolling resistance. The original thought was that (a tire) must be (designated) XL to handle additional



**“Although traditional tires with correct attributes and specifications can be used on EVs, there are many benefits when fitting an electric vehicle with EV-specific tires,” says Jack McClure, segment manager, PLT, Sailun Tire Americas.**

Photo: Sailun Tire Americas

that more tire manufacturers will push out EV specialty tires into the OE and replacement markets in the future.

TGI currently offers EV-compatible tire programs for our consumers. Furthermore, TGI has partnered with private brand OE manufacturers and exclusive brand manufacturers both in Asia and in Europe to develop EV specialty tires. We are well positioned in the EV specialty tire segment, with an estimated launching time in 2024.

**Roman Racela, marketing director, Transamerica Tires:** EVs require specialized tires. Conventional tires made for ICE vehicles typically would not be able to handle the performance requirements of specialized EV tires.

In general, EVs are much heavier than their

weight requirements. As electric vehicles are expanding from sedans to bigger CUVs, SUVs and light trucks, advanced technology is transitioning to high load capacity.

With quieter vehicles, tire noise becomes a bigger factor to ensure quietness. Lastly, rolling resistance affects the number of miles that (EVs can) go between an electric charging station. Advanced technology with different compounds will need to be developed to handle the performance characteristics.

Manufacturers are projecting EV sales to be over 10% by 2030. For this to happen, the infrastructure of high-speed charging stations must be in place.

Retail stores will also need to adjust service requirements to handle the different service needs of electric vehicles. ■



# How electric vehicles impact tire design

TIREMAKERS JUGGLE WEIGHT, TORQUE, NOISE AND RANGE AS THEY WORK TO MINIMIZE PERFORMANCE TRADE-OFFS



Electric vehicles “may run 15% to 20% heavier than a comparable vehicle, but that’s going to change,” says Richard Smallwood, CEO and president of Sumitomo Rubber North America Inc. (SRNA.) “Batteries are going to get lighter. I would bet in the not-too-distant future, the weight of electric vehicles will be at parity with gas-powered vehicles.” Tire technology also will continue to evolve, he adds. (Pictured, a Tesla Model 3 running a set of Falken Ziex ZE960 A/S tires from SRNA.)

By **Mike Manges**

The United States is the third-largest electric vehicle (EV) market in the world behind China and Europe. More than 1.74 million light-duty, plug-in electric vehicles have been sold in the U.S. since 2010. EV registrations in the U.S. reached a record market share of 1.8% during 2020, according to IHS Markit.

While still making up a relatively small percentage of all personal vehicles sold in the U.S., the number of EVs on American roads is expected to multiply over the next several years as governments and vehicle manufacturers pursue electrification, while historic hurdles to widespread EV acceptance — including “range anxiety” (see sidebar on page 44) and high retail prices — reduce in significance. (IHS Markit believes that EVs will account for 3.5% of light-duty vehicles

sold in the U.S. during 2021 and more than 10% by 2025.)

This shift presents challenges for tire dealers, who will need to know how to service electric vehicles, and for tire manufacturers, who are designing and building tires that are specifically tuned to EV design and performance.

The differences between present-day electric vehicles and traditional, gas-powered vehicles are significant.

EVs are generally heavier than their internal combustion engine-equipped counterparts.

They generate more torque and less noise. And EV range is not always comparable to what a tank of gas can deliver, although OEMs are working hard to extend range limits. (Last month, General Motors announced that it is developing an all-electric version of the Chevy Silverado pickup that will have a 400-mile range.)

MTD recently spoke with tire manufacturers who have an original equipment presence in the U.S. to learn how EVs are impacting tire design and construction.

## A WEIGHTY MATTER

EVs are typically heavier than comparable gas-powered cars. (The Tesla Model 3 sedan tips the scales at around 3,500 pounds. The Honda Civic sedan, a similarly sized car, weighs around 2,900 pounds.)

“Due to the weight of their batteries, the overall weight of the electric vehicle tends to be heavier,” says Richard Smallwood, CEO and president of Sumitomo Rubber North America Inc.

“As battery technology advances, that weight disparity will diminish — possibly disappearing entirely — but today the weight difference is



in the 15% to 20% range, depending on the model of the vehicle.

“As we know, greater vehicle weight has a negative impact on the life of the tire and the handling characteristics of the tire and vehicle combination,” he says.

Robin Wilkes, vice president of original equipment, Pirelli Tire North America, says tire manufacturers “have to make sure that tires of the same size have the ability to carry the extra weight” of EVs.

“Sometimes this can be done by changing the tire’s size. But beyond that, you have the high load capacity (tire) designation, which is creeping up in Europe and in the past, we really didn’t have a need for.”

“EVs are pushing the envelope of tire design in terms of load carrying capabilities,” says Mauricio Mendez Sotelo, technical product management, research and development, passenger and light truck tires, Continental Tire the Americas LLC.

“Tires need to be able to carry higher loads and require higher inflation pressure in order to carry that load. Original equipment manufacturers are looking at, ‘How can we make tires with the dimensions we currently have that can carry the higher load, without building bigger tires?’”

“The vast majority of EV tires on the market are currently in XL sizes to accommodate the increased load,” says Ben Patel, senior vice president and chief technology officer, Cooper Tire & Rubber Co.

“And some manufacturers have announced intent to begin making ‘HL’-designated tires for even more capacity. This requires a more robust and heavier construction.”

## INSTANT TORQUE

“Another interesting thing about EVs is the instantaneous torque” they create “and the fact that EVs can generate 100% of their torque at zero rpm,” says Dale Herrigle, chief engineer for product development, consumer replacement, Bridgestone Americas Inc.

“There is a lot of work going on with tire wear — first off, understanding the implications of EVs on wear and also how we adjust tire construction and patterns to give customers the long wear life they are used to.

“In addition, (EV) braking characteristics are slightly different than classic vehicles with conventional brakes,” he says. “We have to understand how all of those factors affect wear over the lifespan of the tire. I think a lot will come down to material technology and some tread pattern technology.”



Michelin North America Inc. is bringing its first tire specifically designed for electric vehicles to the North American market. Currently sold in China, the Michelin Pilot Sport EV will be available in the United States and Canada during the third quarter of 2021. “The focus on tire performance has been elevated” by EV technology, says Steve Calder, technical marketing manager, Michelin.



“One thing that is unique about EVs is how tunable the vehicles are once they leave the factory,” says Dale Herrigle, chief engineer for product development, consumer replacement, Bridgestone Americas Inc. “I think we’ll see a lot of dependence on the end user in what kind of life they get out of their EV tire fitments” due to driving habits. (Pictured, a BMW i3 equipped with Bridgestone tires.)

Thomas Kenny, senior director of research and development for Yokohama Tire Corp., says a 20% loss in treadwear “is not uncommon” with high-torque electric vehicles.

“Tires used for EV applications will require a paradigm shift in the way they are designed if they are to perform at a level commensurate with their non-EV counterparts. This includes a stiffer tread block design, the use of more robust construction and in some cases, new compound technology.”

## CUT THE NOISE

The absence of gas-powered engines and all the sounds they generate means EV tires must be engineered to produce even less noise than usual.

“Weight and torque are certainly the issues you hear the most about” when EVs are discussed, says Aaron Neumann, product development manager at Nexen Tire America Inc.’s technical center.

“But those aren’t probably our top two concerns. As we develop tires for EVs, there is greater emphasis on noise and vibration.

## What dealers need to know about EV tires

### *Straight talk from tire manufacturers*

We asked tire manufacturers, “What do tire dealers need to know about the performance demands that electric cars place on tires?” Here’s what they had to say:

**Dale Herrigle, chief engineer for product development, consumer replacement, Bridgestone Americas Inc.:** “I think the primary focus” for dealers “should be on wear and rolling resistance. When they find a tire that works well on EVs, it would be good to stay with that tire.”

**Mauricio Mendez Sotelo, technical product management, research and development, passenger and light truck tires, Continental Tire the Americas LLC:** Checking air pressure “will be much more critical for EVs in terms of the contribution of the pressure of the tire to the weight of the car. Pay attention to inflation pressure.”

**Ben Patel, senior vice president and chief technology officer, Cooper Tire & Rubber Co.:** “Electric cars now have a wide range of performance, just like traditional internal combustion engine cars — everything from economy-oriented city commuters to high performance supercars. The overarching theme is that an EV will generally weigh more, though, so the load capacity and inflation pressures of an EV need to be matched to any replacement tire fitted.”

**Steve Rohweder, vice president, technology development, Goodyear Tire & Rubber Co.:** “EVs present a specific set of challenges and demands related to load, torque, noise, range, rolling resistance and overall performance. Many experts advise replacing tires with OE models not only designed for EV needs, but specifically made to fit that precise model.”

**Rodrigo Uso, senior technical account manager and technical sales team leader, North America, Hankook Tire America Corp.:** “Let customers know that each vehicle has been tuned for every OE tire. In order to make sure the end user continues to experience the same performance of their vehicle, it’s extremely important that dealers know how to convince their customers to use only the OE tire because it is the right fit.”

**Rick Cunat, managing director of Kumho Tire USA Inc.’s Americas technical center:** “The transformation to EVs will certainly have an impact on the maintenance sector of the

business. Oil changes are eliminated and brake service is significantly reduced due to regenerative braking. The items that will need maintenance on EVs are wiper fluid, wiper blades and tires.”

**Steve Calder, technical marketing manager, Michelin North America Inc.:** “A driver with a heavy foot can absolutely tear through a set of tires more rapidly than with an internal combustion engine vehicle” due to the extra weight of EVs.

**Aaron Neumann, product development manager at Nexen Tire America Inc.’s technical center:** Dealers “need to be careful about what they are selling. They may get customers who might have a complaint about the uniformity or vibration of a tire. They might get more of those with EVs because EVs are so refined. Quiet tires work better on an EV. You’ll get fewer complaints.”

**Robin Wilkes, vice president of original equipment, Pirelli Tire North America:** “The biggest thing for dealers to keep in mind is that we know EVs are wearing tires out more quickly than traditional vehicles. Studies peg (wear) at 20% quicker than regular internal combustion engine vehicle tires. Dealers will see people coming in to replace tires on EVs more regularly.”

**Richard Smallwood, CEO and president, Sumitomo Rubber North America Inc.:** “Not every EV customer will have the same wants and desires. One size does not fit all, so the dealer needs to listen to the customer and then know which tire options are available to them.”

**Conrad Galamgam, vice president, product planning and technical services, Toyo Tire U.S.A. Corp.:** Electric vehicles “provide an opportunity for tire dealers to help their customers identify and recommend the right tire to match their electric vehicle experience. Luxury EVs with high torque and air suspension will need high performance tires designed with improved treadwear.”

**Thomas Kenny, senior director of research and development, Yokohama Tire Corp.:** “Tire warranty — specifically treadwear — that was developed based upon a standard vehicle application will be more difficult to achieve on an EV.”

If you’ve had a chance to ride in an EV, you’ll know how smooth and quiet they are.

“The electric motor does not produce near the vibration of the internal combustion engine, which has been masking noise and vibration from other parts of the vehicle for a while,” notes Neumann. “Any noise or vibration that comes from the tire is more pronounced” in an electric vehicle.

“Noise is probably more annoying” to EV owners than it is to traditional car owners, according to Rodrigo Uso, senior technical account manager and technical sales team leader, North America, Hankook Tire America Corp.

To EV drivers, “tire noise becomes super-important and manufacturers are looking at noise from a different perspective,” he says.

“There are some unique technologies that have been introduced on tires for EVs, including a foam absorber — pretty much a piece of foam that is attached to the inside of the tire that’s going to help absorb cavity noise.”

### WITHIN RANGE

Low rolling resistance tires are normally associated with gas-powered vehicles. But in order to optimize battery range, EVs also require low rolling resistance tires, according to Rick Cunat, managing director of Kumho Tire USA Inc.’s Americas technical center.

“For tires, the primary source of drag is rolling resistance. In addition, the aerodynamics of the tire contribute to the vehicle’s overall drag.

“There are many ways tire manufacturers can address rolling resistance through innovative materials and tire cavity shape to maximize all performance attributes that EVs demand.”

Consumers “are looking for range and tire life. That’s the whole game.”

“The focus on tire performance has been elevated” by EVs, says Steve Calder, technical marketing manager, Michelin North America Inc.

“In general, with an internal combustion engine, roughly 20% of the fuel burn is used to overcome the rolling resistance of the tire, so any improvement we can make in rolling resistance has a direct impact on the vehicle.”

The same principle applies to electric vehicles, he adds.

“You can (gain) range if you put on a tire that has very low rolling resistance versus putting on a traditional tire.”

### DOWN THE ROAD

While tire manufacturers continue to hone today’s EV tire technology and design, they also are eyeing what’s next.

## On the grid

*More charging stations will help treat 'range anxiety'*

"Range anxiety" — the fear that an electric vehicle's (EV) battery will drain to zero before the car reaches its destination — remains a concern among current and potential EV owners.

As of April 14, 2021, there were 98,982 publicly accessible EV charging stations throughout the U.S., including Hawaii. President Joe Biden's recently announced American Jobs Plan calls for the establishment of 500,000 new electric vehicle charging stations nationwide.

Here are the states with the most publicly available EV charging stations, according to [www.plugshare.com](http://www.plugshare.com):

Rank	State	Number of Stations
1	California	24,336
2	Florida	5,267
3	New York	5,136
4	Texas	4,800
5	Washington	4,033
6	Georgia	3,067
7	Colorado	2,696
8	Virginia	2,667
9	Massachusetts	2,602
10	Michigan	2,502

The state with the fewest number of stations? Alaska, which has 124 public charging points.



"I would say rolling resistance is one of the most important parameters in terms of getting the most range out of the vehicle and also combating range anxiety for people who are just getting into EVs," says Robin Wilkes, vice president of original equipment, Pirelli Tire North America. Pirelli has developed special versions of three of its Scorpion tires for vehicles made by electric car manufacturer Rivian.



Continental AG, parent company of Continental Tire the Americas LLC, recently unveiled an "HL" tire to address the extra weight of electric cars. "Inflated to the same pressure, these tires have a higher load capacity than those built to the former XL standard," say Continental officials. The tire is being developed for original equipment use. A replacement offering will eventually be available.

"If you look at tire performance today versus 20 years ago, we've made huge gains," says SRNA's Smallwood.

"The thresholds continue to get higher. Twenty years from now, the tires for EVs will probably be better than our best-handling tires today"

Tire dealers also should be aware that the number of EV tires available in the replacement channel will increase over time, says Conrad

Galamgam, vice president, product planning and technical services, Toyo Tire U.S.A. Corp.

"With the proliferation of EVs over the next decade, it will be more important than ever to monitor new tire sizes, higher load carrying capacities and ideal performance ratings to match the requirements of these new vehicles and enhance the electric vehicle experience." ■





# What's the most important thing to remember when selling EV tires?

FOR STARTERS, THERE'S MORE THAN ONE.  
TIRE MANUFACTURERS LIST THEM HERE

"The most important thing that dealers should remember is that the characteristics of EVs and internal combustion engines are very different in regards to what they demand from their tires in terms of performance," say Hankook Tire North America officials.

By **Mike Manges**

**T**he key to selling replacement electric vehicle (EV) tires is first understanding the mentality of EV owners, says Ron Dolan, president of Sailun Tire Americas.

"The EV owner is a very different type of buyer than the regular car owner. These are people who might have bought their car online and didn't go to a traditional (car) dealership. For the most part, they are first adopters of technology. They do a ton of research. They have figured out what's important to them."

And like owners of gas-powered cars, they're looking for expert advice when it comes to replacement tire options.

That's why tire manufacturers say dealers need to have a thorough understanding of EV design dynamics, EV tire construction and how installation of the correct replacement tire can preserve — and even enhance — vehicle performance.

In this article, representatives from various tire manufacturers — including some that currently offer EV tires — weigh in with advice.

"Tire selection can change the personality of a car — giving it better handling, improved fuel economy or EV range, a quieter ride

and greater comfort," says Brad Robison, senior product manager, Bridgestone Americas Inc. "Choosing the right tire for the type of vehicle and the customer's preference is important."

**Brandon Stotsenburg, vice president, automotive division, American Kenda Rubber Co. Ltd.:** Although there are new aftermarket tires targeted specifically for the growing EV and plug-in hybrid vehicle segment, many of the tires currently fitted as original equipment (OE) on EVs are traditional grand touring, CUV or light truck tires that the original equipment manufacturer has sourced from (tire) manufacturers. The key issue that is most critical for EV vehicles is assuring that performance due to higher torque is accommodated. This will certainly affect the handling and expected wear on the majority of available vehicles currently offered by Tesla, Rivian, Ford, General Motors, Hyundai, Audi and Volkswagen, as examples.

Although rolling resistance affects the expected distance driven for battery life, it is secondary to ensuring that the vehicle will perform properly and safely in the owner's expected driving environment specific to that vehicle.

## Sailun touts 'revolutionary' mixing technology

*New EV tire will showcase EcoPoint<sup>3</sup>*



The first application of Sailun's new EcoPoint<sup>3</sup> mixing technology will be the company's ERANGE EV, a tire that is exclusively engineered for electric vehicles.

Sailun Tire Americas is using its new ERANGE EV tire to showcase the company's recently unveiled liquid phase mixing technology, EcoPoint<sup>3</sup>, which allows rubber compounding materials to be mixed "fully uniformly, under continuous liquid phase conditions."

Sailun officials are calling EcoPoint<sup>3</sup> "revolutionary" in terms of both the mixing flexibility it offers and the tire performance it provides.

"EcoPoint<sup>3</sup> technology not only improves a tire's rolling resistance for increased efficiency, but (it) also enhances traction and provides more durable tire wear resistance — making tires that can last longer and perform better for a safer, more energy-efficient and comfortable drive."

Sailun officials say EcoPoint<sup>3</sup> "is ideally suited for the demands of EV drivers and will enhance EV performance by helping to increase range, enhance performance and deliver a quiet ride and comfortable driver experience." EcoPoint<sup>3</sup> has been in development for nearly 10 years, says Ron Dolan, president of Sailun Tires America. "The Sailun Group has invested a ton of time to bring it to the point where we can commercialize it."

The technology, which is applied at the beginning of the rubber mixing process, "allows us to be very pinpointed in what we want the tire to do."

Dolan says it's "fantastic for EV tires and we can apply it" to other tires. "We're going to have an SUV tire with this technology."

"We're set up to use EcoPoint<sup>3</sup> at all of our facilities," with the majority of production taking place at Sailun's plant in Cambodia.

**Robison (Bridgestone):** EVs have a few very pronounced qualities that customers are likely to notice more than in a traditional car or truck — weight, torque, noise and range. EVs tend to be heavier, with greater and immediate torque, which can impact tire durability. In some cases, EVs can be considerably quieter on the road due to lack of engine noise — meaning that tire and wind noise become more pronounced to the passenger.

And finally, as we continue to see strides in EV charging infrastructure across the United States, rolling resistance and a tire's ability to maximize vehicle travel distance per charge can play a big role in a customer's enjoyment of their EV.

There are several ways to ensure that a customer drives away happily in their EV. And

choosing the right tire for their driving style and vehicle type is a great way to make sure that each customer's car is suited to their needs.

**Michiel Kramer, general manager, consumer product marketing, Goodyear Tire & Rubber Co.:** As with all vehicles, there are several parameters to keep in mind when considering tire replacement. Dealers should ensure the tire meets the vehicle's size, load and speed requirements. It is also paramount to understand how the consumer uses their EV and their overall driving needs.

**Chris Jenkins, programs and marketing manager, automotive division, Maxxis International—USA:** There are several important points to keep in mind. First, be sure to match or

exceed the OE tire load index recommendation.

EVs are typically heavier than normal internal combustion engine vehicles. To avoid any issues of rapid wear or premature tire failure, you should recommend tires that can take the vehicle's load and perform under heavier-stress conditions.

For EVs, installing low rolling resistance tires is key to maintaining the vehicle's range. Without the sounds made by an engine, road and tire pattern noise are more noticeable in the (vehicle's) cabin, so tires for EVs should maintain low pattern noise throughout the life of the tire.

EVs have instant torque as soon as you press the accelerator. This increases wear and tear on tires, which may be why EV owners have complained of OE tires wearing out faster than they expected. If your customer makes this complaint, recommend tires that maintain grip, but still have good tread life.

**Aaron Neumann, product development manager, Nexen Tire America Inc.:** The user should always be first. An EV still has to navigate the same roads and conditions as a regular vehicle and understanding what the user needs out of a tire is the most important thing — whether that be snow traction capability or mileage for someone who has a long commute.

For the majority, EV owners prioritize range as the most important thing, so dealers should consider a tire with the lowest rolling resistance. However, you also have EV customers who own performance EVs like the Porsche Taycan and want to maintain high levels of steering and handling performance. This means they will need a very specific ultra-high performance tire.

At the end of the day, the average EV driver wants the same things out of a tire as anyone else — safety, traction, good mileage and good value.

**Steve Bourassa, director of products, Nokian Tyres Inc.:** While there are many important factors to consider — such as noise level and the tire's ability to handle the added torque generated by an EV — one factor impacts EV driving more than any other: a tire's rolling resistance.

EV drivers crave consistent, efficient range for each charge, especially since the charging infrastructure is still spotty in many areas of the United States and Canada. Inefficient tires can lead to suboptimal or unpredictable range and even situations where drivers might find themselves stranded.

**Ian Coke, chief technical officer, Pirelli Tire North America Inc.:** In our view, the most important thing a tire dealer should consider is the consumer. OE tires and especially those on EVs have been specifically designed for that vehicle, considering a wide number of criteria focused on safety (load and speed) range (rolling resistance), handling and noise. However, consumers may weigh these attributes differently and while replacing with the OE fitment will replicate the (vehicle's) performance, this may not always be in line with specific user requirements. This is mostly true when looking at trade-offs between range and wear.



EVs “are heavier because of the weight of their batteries,” according to Michelin North America Inc. officials. “To maximize battery life, EVs need low rolling resistance tires. Lastly, EVs have higher and more sustained torque levels than combustion-powered vehicles.” Michelin and other tire suppliers are optimizing design, construction and manufacturing to provide replacement tires that allow EVs to retain their performance characteristics.

Another important thing a tire dealer should keep in mind when replacing EV tires is mileage. EVs consume tires faster than an internal combustion engine vehicle due to generally higher vehicle weights, larger amounts of instantaneous wheel torque and the increasing push toward lower rolling resistance.

Noise also is very important. One of the biggest differences consumers notice when stepping into an EV is the immediate lack of engine noise, which amplifies the importance of tires.

When the tire is the only major source of noise in a vehicle, it needs to have a properly tuned pattern and a well-damped cavity — often with foam — to maintain the quiet ride expected by the end consumer.

**Jared Lynch, director of PLT sales, Sailun Tire Americas:** EVs come with a lot more torque power and are a lot heavier, so the construction of the (EV) tire is slightly different, but very critical for performance. Number one, it has to carry the load of the vehicle. That's of the utmost importance.

So many EVs, when they came out, were high-horsepower. So what we've seen tire manufacturers do is take max-performance summer tires and apply them to EVs.

Fast forward and it's not that simple. There are different types of EVs now. There's not just one cookie-cutter Tesla. Plenty of people are buying (EVs) as daily drivers.

**Anthony Lee, manager, technical services, Toyo Tire U.S.A. Corp.:** The required load carrying capacity and OE manufacturer load inflation pressure requirements are important for EV fitments. This might sound like a fundamental issue, but batteries add weight and original equipment tires for EVs will require extra-load (XL) or reinforced tires and some could be equipped with high-load capacity-rated tires.

XL or reinforced tires are designed to carry higher loads at higher inflation pressures and it's important for retailers to properly recommend tires that are designed to handle the higher loads at the higher inflation pressures required for EVs.

**Drew Dayton, senior product planning manager, consumer, Yokohama Tire Corp.:** When replacing tires on any EV platform — or non-EV platform — a tire dealer needs to understand the customer's needs. Using the customer's current tire experiences to set a baseline expectation can help a dealer pick the best replacement options.

Questions (can include) has the OE tire met performance expectations? Did the OE tire last long enough? Is your current EV range a concern? Is the primary focus maximum performance, maximum range, maximum tread life or something in between?

An EV tire customer has similar needs as non-EV customers. Some may prioritize range and rolling resistance above all else, while other customers will be interested in more balanced performance, with a tire that is fun to drive and lasts a long time.

Representatives from Hankook Tire North America and Michelin North America Inc. also provided advice.



“While there are many important factors to consider — such as noise level and the tire's ability to handle the added torque generated by EVs — one factor impacts EV driving more than any other: a tire's rolling resistance,” says Steve Bourassa, director of products, Nokian Tyres Inc. EV drivers also want “consistent, efficient range for each charge,” he adds.

“The most important thing that dealers should remember is that the characteristics of EV and internal combustion engine vehicles are very different in regards to what they demand from their tires in terms of performance,” say Hankook officials.

“Tires that are tailored to EVs have significant differences in how they are constructed and are expected to perform.

“There are several factors that are crucial to consider when developing these products, such as extra weight from the battery, increased torque and lower cabin noise, which are among the most notable factors to address.

“Keeping these differences in mind, dealers will be able to provide guidance to customers that is far better-tailored to their needs and the needs of their vehicles.”

EVs “are heavier because of the weight of their batteries,” note Michelin officials. “To maximize battery life, EVs need low rolling resistance tires.

“Lastly, EVs have higher and more sustained torque levels than combustion-powered vehicles.” ■

