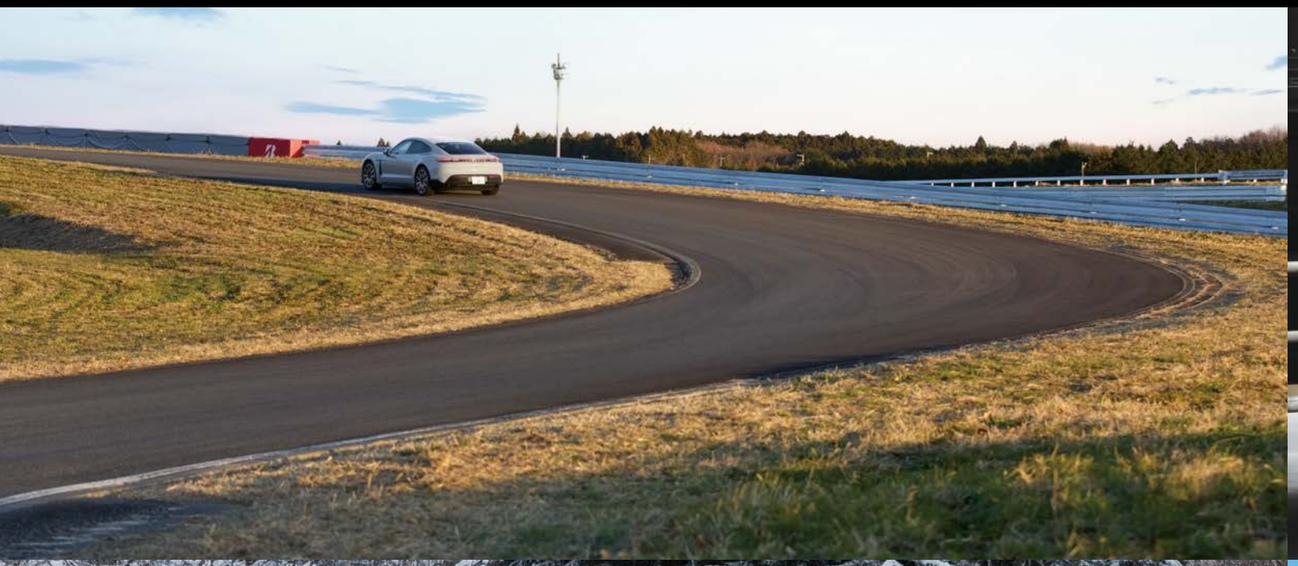
BRIDGESTONE
Solutions for your journey

Proving Grounds



Measuring friction coefficient by braking force and vertical load with dedicated vehicle.

Supporting Tire Development with Real-Vehicle Tests Designed for Specific Usage Conditions and Regional Characteristics

Bridgestone's development philosophy is to provide peace of mind in all aspects of its products, and we are constantly considering the environment and pursuing safety and comfort in order to create new added value. We conduct real-vehicle testing, which is essential for development, at proving grounds and test courses in 12 locations in eight countries around the world.

Integrating Human Sensibility and Advanced Measurement Technology to Evaluate Tires from the Customer's Perspective

At the proving ground, we conduct tests using real vehicles on tracks created to simulate a variety of driving conditions, and evaluate the performance of tires in the prototype stage. Although real-vehicle tests present difficulties in controlling environmental conditions such as weather, we are able to conduct tests under conditions close to those of actual use, primarily through sensory testing based on human sensibility and tests using advanced measurement technology. This has many advantages, such as being able to conduct tests from the customer's perspective and obtaining highly accurate results.

Bridgestone Proving Ground

The majority of Bridgestone's real-vehicle tests are carried out at the Bridgestone Proving Ground in Nasushiobara, Tochigi. Built in 1977 and expanded in 1989 to meet diversifying needs, particularly for higher-performance tires. The facility covers approximately 76 hectares and includes a 3.9 km high-speed oval and a 110 m-diameter skid pad, along with various other tracks that allow comprehensive evaluation of tire performance. Tests are conducted on tires across a wide range of categories - including passenger cars, trucks and buses, and motorcycles - using diverse vehicles under market-simulated driving conditions.

Construction : 1977 (Stage1) 1989 (Stage2: extension)
Site : approximately 76.3 hectares
High-speed oval : 3.9km (1.3km straight section)
Bank angle : Maximum 38 degrees

Handling and Stability Tests

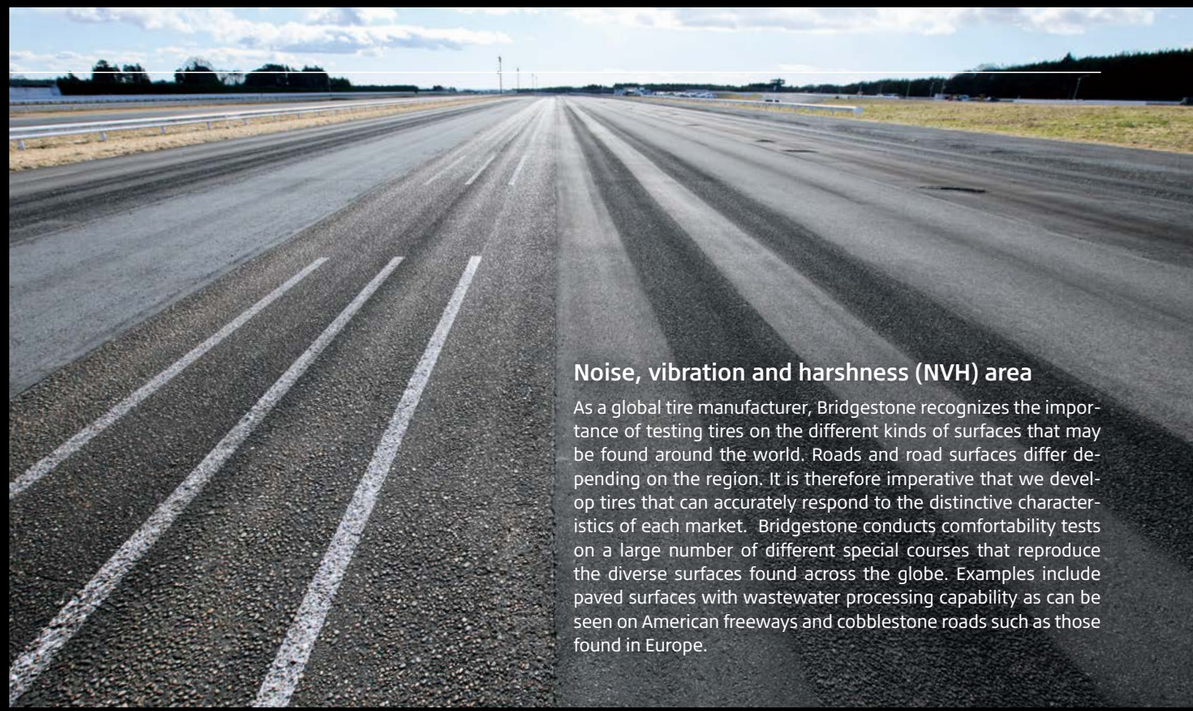
High-speed oval

On the 3.9 km high-speed oval, stability at high speeds is tested. Rigorous high-speed tests push both vehicles and tires to their limits, with driving at speeds exceeding 200 km/h possible.

Dry handling track

The dry handling track, with elevation changes and a variety of corners, is used to verify handling stability and at-the-limit characteristics.

Comfortability Tests (Riding comfort, Noise)



Noise, vibration and harshness (NVH) area

As a global tire manufacturer, Bridgestone recognizes the importance of testing tires on the different kinds of surfaces that may be found around the world. Roads and road surfaces differ depending on the region. It is therefore imperative that we develop tires that can accurately respond to the distinctive characteristics of each market. Bridgestone conducts comfortability tests on a large number of different special courses that reproduce the diverse surfaces found across the globe. Examples include paved surfaces with wastewater processing capability as can be seen on American freeways and cobblestone roads such as those found in Europe.

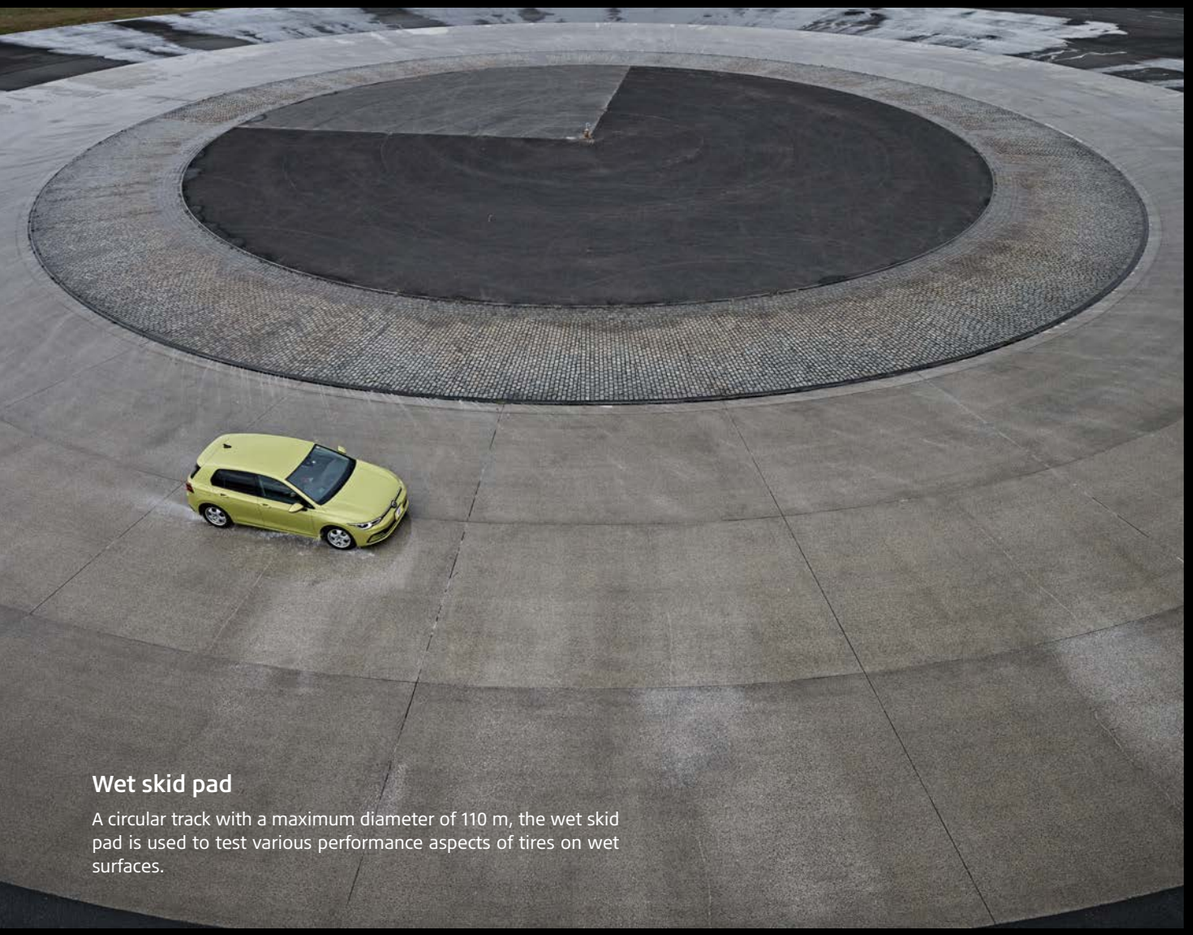
Pass-by noise test area

Reducing pass-by noise is crucial to maintaining a better living environment. We perform repeated, rigorous measurements and feed the results back into tire development.

Wet Performance Tests

An indispensable element in the pursuit of peace-of-mind and safety is improving tire performance in the wet. Braking, grip and hydro-planing capabilities on wet surfaces are tested at our specially made wet-weather test tracks.

Tire Hydroplaning: Tire hydroplaning is loss of vihicle handling and braking control at high speeds caused by a wedge of water which lifts a tire off the road surface.



Wet skid pad

A circular track with a maximum diameter of 110 m, the wet skid pad is used to test various performance aspects of tires on wet surfaces.

Wet handling track

Maneuverability and limitation characteristic tests are conducted on wet surfaces with a variety of different corners.

Wet straight track

Braking performance tests on wet surfaces are conducted.

Cornering hydroplaning track

Vehicles pass through a pool placed on a corner to simulate a puddle, and the speed at which hydroplaning occurs is measured.

Durability Tests

Rough roads

We conduct reproduction tests using a variety of road surfaces to investigate tire durability and wear, based on factors such as failure patterns that arise in the market.

Hokkaido Proving Ground

In order to respond to sophisticated and diversified customer requirement for studless tires, the Hokkaido Proving Ground was built in Shibetsu, Hokkaido in 1996. With a total area of roughly 237 hectares and under harsh conditions in winter, this expansive proving ground is used to test winter tires to be used in various locations worldwide.

Established : 1996
Site : approximately 236.9 hectares
Gradient : Maximum 14%

Ice Performance Tests

Ice circle

The polished circular ice surface is used for various tests of turning performance.

Ice straight track

The straight icy course laid out inside the hall is used to test braking performance and acceleration in a controlled environment from which all snowfall effects have been removed.

Snow Performance Tests

Snow handling track

The snow handling track, incorporating elevation changes and various types of corners, is used for comprehensive evaluations of starting, acceleration, braking, and cornering performance.

Snow straight track

On a straight track up to 1 km long, braking and traction performance on compacted snow are tested for passenger cars as well as large vehicles such as trucks and buses.

Traction capability: The ability to transmit a tire's drive force to the road surface.

Snow slope area

Seven slopes ranging from a gradient of 3.5% to a maximum of 14% are used to test hill starts and acceleration on snowy slopes.

Extensive Driving Tests and Evaluations of Tire Performance under a Wide Range of Conditions around the World

With proving grounds and test courses in Japan, North America, Central and South America, Europe, Asia and China, Bridgestone Group can conduct tire performance tests under any driving condition suited to any market. As a result, we have the ability to develop tires that accurately respond to the diverse demands of different road surfaces around the world.

Proving grounds

Professional drivers conduct a final check of customer value and perform a comprehensive evaluation.

1 Tochigi, Japan

Evaluates tires for various vehicles on a diverse range of test tracks, to meet the needs for higher performance.

2 Hokkaido, Japan

Under harsh winter-weather conditions, we can conduct various tests of winter tires used worldwide.

3 Texas, U.S.A.

Evaluates tires for the North American market; large site with 12km circuit and other tracks to test dry and wet weather handling and comfort.

4 Ohio, U.S.A.

Exclusively for tires for agricultural equipment.

5 Acuna, Mexico

Exclusively for wear and endurance tests.

6 Sao Pedro, Brazil

Evaluates tires for the South American market; can test tires for dry and wet weather handling and comfort.

7 Aprilia, Italy

Evaluates tires for the European market; there is capabilities to test dry and wet handling and ride comfort for many categories tires.

8 Ayutthaya, Thailand

Checks performance of tires made locally and imported especially for the Thai market.

9 Karawang, Indonesia

Checks performance of tires made locally and imported especially for the Indonesian market.

10 Jiangsu, China

Checks performance of tires made locally and imported especially for the Chinese market.

Test courses

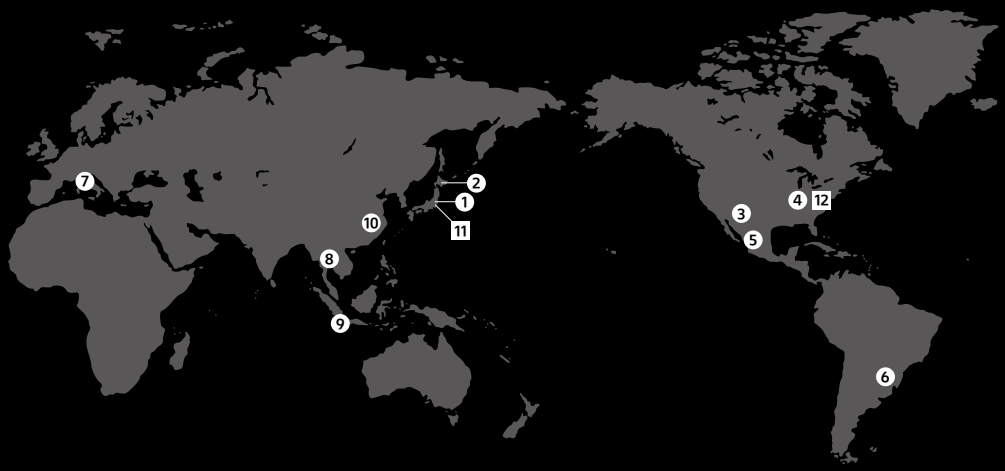
Engineers check and demonstrate the potential and underlying theories of individual technical items.

11 Tokyo, Japan

B-Mobility (within Bridgestone Innovation Park)

12 Ohio, U.S.A.

Adjacent to the technology center in Akron, Ohio.



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