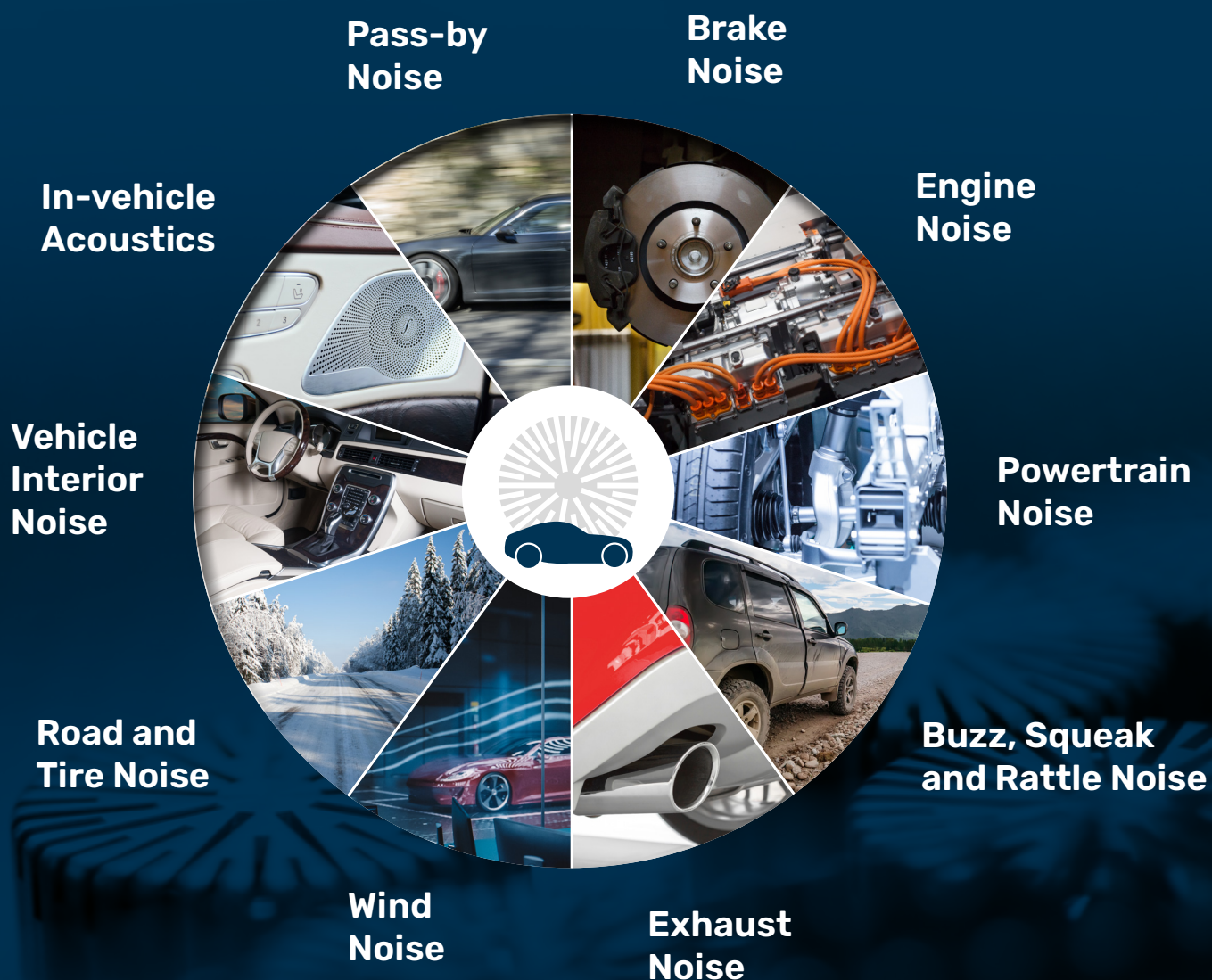




# Automotive acoustic standards are evolving – are you keeping up?



# GRAS Sound & Vibration;

## A microphone for every challenge in modern NVH testing

### Brake Noise

A major challenge for brake noise measurements is to be able to record brake noise at the best possible quality during on-road testing in all climate zones and weather conditions.

### Engine Noise

To get optimal measurements of engine noise, you need microphones that are both able to achieve repeatable measurements in positions that are hard to reach, and that will survive rough handling and tough conditions on the proving ground.

### Powertrain Noise

Even though powertrain noise is drastically reduced on EVs and HEVs, other noise sources become annoying and new frequency content is unmasked. GRAS Sound & Vibration provides a number of standardized measurement microphones for the many different stages of powertrain testing.

### Buzz, Squeak and Rattle Noise

Squeak and rattle problems are often detected at a very late stage, even after production start, and can be the reason for high warranty costs. Good tools are important for fast problem identification and verification of measures like adding felt tape.

### Exhaust Noise

For exhaust noise testing, it is important to consider the harshness of the environmental conditions during the operational measurements: Heat, dust, humidity, and exhaust flow take their toll on your measurement equipment.

### Wind Noise

Mounting, demounting, remounting as well as verification of sensors become highly critical for ensuring reliable data easily, efficiently and within budgets. GRAS Sound & Vibration provides a unique range of microphone solutions for testing full-scale models in wind tunnels and on-road.

### Road and Tire Noise

Road noise is one of the most annoying interior noises in any vehicle. External tire noise is also more and more critical for fulfilling pass-by noise regulations. Rugged and reliable equipment is critical since testing is often performed at a test track off-site.

### Vehicle Interior Noise

Vehicle interior noise, vibration, and harshness (NVH) involves many different tests – all related to noise inside the vehicle originating from road, body, chassis, and components of the vehicle. GRAS Sound & Vibration provides solutions that can be used at all project levels, under a wide variety of measurement conditions, and across both EV, HEV, and ICE vehicles.

### In-vehicle Acoustics

Consumers are increasingly expecting high-quality sound systems and infotainment systems with voice commands. This drives the importance of ensuring good acoustics, free from reverberation and excess dampening in desired frequency ranges, to the fore.

### Pass-by Noise

Pass-by noise is an important part of the branding efforts of vehicles – and without meeting regional targets for pass-by noise, a vehicle model cannot get a type approval or be put on the market.



For more information on our range of measurement microphones for NVH and acoustics testing of both EV, HEV, and ICE vehicles, please visit our website.  
**[www.GRASacoustics.com](http://www.GRASacoustics.com)**

# Automotive acoustic standards are evolving - are you keeping up?

Constant improvements in vehicles are pushing acoustic boundaries. Better audio systems and noise mitigation solutions, voice commands, and advanced infotainment systems, all point to one end: Higher demands for more precise acoustic testing, new test methods, and more reliable data.

As the world leader in developing cutting-edge acoustic sensors for the automotive industry, GRAS Sound & Vibration provides new and improved microphones for more efficient, precise, and reliable acoustic NVH testing. We cover the full spectrum of automotive acoustic test scenarios for both EV, HEV, and ICE vehicles.





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### About GRAS Sound & Vibration

GRAS is a worldwide leader in the sound and vibration industry. We develop and manufacture state-of-the-art measurement microphones to industries where acoustic measuring accuracy and repeatability is of utmost importance in R&D, QA and production. This includes applications and solutions for customers within the fields of aerospace, automotive, audiology, and consumer electronics. GRAS microphones are designed to live up to the high quality, durability and accuracy that our customers have come to expect and trust.